

FCC RADIO TEST REPORT

according to

47 CFR FCC Part 15 Subpart C § 15.247

Equipment : Dual Band WLAN Adapter
Brand Name : Askey
Model No. : WLU5080-D4(ROHS)
Filing Type : New Application
Applicant : Askey Computer Corp.
10F, No. 119, ChienKang RD., Chung-Ho, Taipei,
Taiwan, 23585, R.O.C.
FCC ID : H8N-WLU5080-D4
Manufacturer : Askey Computer Corp.
10F, No. 119, ChienKang RD., Chung-Ho, Taipei,
Taiwan, 23585, R.O.C.
Askey Technology (Jing Su) Ltd.
No.1388, Jiao Tong Road, Wujiang
Economic-Technological Development Area,
Jiangsu Province, P.R.China
Received Date : Nov. 25, 2011
Final Test Date : Dec. 27, 2011

Statement

Test result included is only for the 802.11b/g/n part of the product.

The test result in this report refers exclusively to the presented test model / sample.

Without written approval of SPORTON International Inc., the test report shall not be reproduced except in full.

The measurements and test results shown in this test report were made in accordance with the procedures and found in compliance with the limit given in **ANSI C63.4-2003** and **47 CFR FCC Part 15 Subpart C**.

The test equipment used to perform the test is calibrated and traceable to NML/ROC.



SPORTON International Inc.

No. 52 Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.

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History of This Test Report

Original Issue Date: Dec. 29, 2011

Report No.: FR160328AC

■ No additional attachment.

☐ Additional attachment were issued as following record:

Attachment No.	Issue Date	Description

CERTIFICATE OF COMPLIANCE

according to

47 CFR FCC Part 15 Subpart C § 15.247

Equipment : Dual Band WLAN Adapter

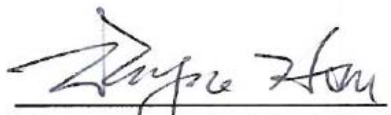
Brand Name : Askey

Model No. : WLU5080-D4(ROHS)

Applicant : Askey Computer Corp.

10F, No. 119, ChienKang RD., Chung-Ho,
Taipei, Taiwan, 23585, R.O.C.

Sporton International as requested by the applicant to evaluate the EMC performance of the product sample received on Nov. 25, 2011 would like to declare that the tested sample has been evaluated and found to be in compliance with the tested rule parts. The data recorded as well as the test configuration specified is true and accurate for showing the sample's EMC nature.


Wayne Hsu / Assistant Manager

SPORTON International Inc.

No. 52 Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.

1 SUMMARY OF THE TEST RESULT

Applied Standard: 47 CFR FCC Part 15 Subpart C				
Part	Rule Section	Description of Test	Result	Under Limit
3.1	15.207	AC Power Line Conducted Emissions	Complies	20.62 dB
3.2	15.247(b)(3)	Maximum Peak Output Power	Complies	3.32 dB
3.3	15.247(e)	Power Spectral Density	Complies	7.72 dB
3.4	15.247(a)(2)	6dB Spectrum Bandwidth	Complies	-
3.5	15.247(d)	Radiated Emissions	Complies	3.11 dB
3.6	15.247(d)	Band Edge Emissions	Complies	1.02 dB
3.7	15.203	Antenna Requirements	Complies	-

Test Items	Uncertainty	Remark
AC Power Line Conducted Emissions	±2.3dB	Confidence levels of 95%
Maximum Peak Output Power	±0.8dB	Confidence levels of 95%
Power Spectral Density	±0.5dB	Confidence levels of 95%
6dB Spectrum Bandwidth	±8.5×10 ⁻⁸	Confidence levels of 95%
Radiated Emissions (9kHz~30MHz)	±0.8dB	Confidence levels of 95%
Radiated Emissions (30MHz~1000MHz)	±1.9dB	Confidence levels of 95%
Radiated / Band Edge Emissions (1GHz~18GHz)	±1.9dB	Confidence levels of 95%
Radiated Emissions (18GHz~40GHz)	±1.9dB	Confidence levels of 95%
Temperature	±0.7℃	Confidence levels of 95%
Humidity	±3.2%	Confidence levels of 95%
DC / AC Power Source	±1.4%	Confidence levels of 95%

2 GENERAL INFORMATION

2.1 Product Details

Only the radio detail of IEEE 802.11b Port 1/g/n is shown in this report. For more detailed features description, please refer to the manufacturer's specifications or user's manual.

Items	Description
Power Type	Power from host
Data Modulation Data Rate (Mbps)	DSSS for IEEE 802.11b Port 1 (DBPSK / DQPSK / CCK) (1/2/ 5.5/11) OFDM for IEEE 802.11g Port 1 (BPSK / QPSK / 16QAM / 64QAM) (6/9/12/18/24/36/48/54) See the below table for IEEE 802.11n
Frequency Range	2400 ~ 2483.5MHz
Channel Number	11b/g/n (20MHz): 11 ; 11/n (40MHz): 7
Channel Band Width (99%)	802.11b/g : 11b: 15.44 MHz ; 11g: 16.56 MHz 802.11n : MCS 0 (20MHz) : 17.72 MHz ; MCS 0 (40MHz) : 36.16 MHz MCS 8 (20MHz) : 17.76 MHz ; MCS 8 (40MHz) : 36.24 MHz
Conducted Output Power	802.11b/g : 11b: 19.57 dBm ; 11g: 23.73 dBm 802.11n : MCS 0 (20MHz) : 23.85 MHz ; MCS 0 (40MHz) : 23.52 MHz MCS 8 (20MHz) : 26.68 dBm ; MCS 8 (40MHz) : 26.19 dBm

2.2 Table for Filed Antenna

Antenna Category Information (2.4GHz Band)	
☐	Equipment placed on the market without antennas
☒	Integral antenna (antenna permanently attached)
☒	Temporary RF connector provided
☐	No temporary RF connector provided
☐	External antenna (dedicated antennas)
☐	Single power level with corresponding antenna(s)
☐	Multiple power settings and corresponding antenna(s)
☐	Professional Install
☐	Unique antenna connector
☐	BIOS lock.

Antenna General Information (2.4GHz Band)					
Ant. No.	Category	Type	Brand	Model	Gain (dBi)
1	Internal	PIFA	--	--	2.26
	Internal	PIFA	--	--	2.26
☐ EUT is consist of single model antenna assembly for spatial multiplexing MIMO configuration. ☒ EUT is consist of multiple model antennas assembly (secondary source multiple model antennas regardless of spatial multiplexing MIMO configuration), the test (except DFS test) should be performed with highest antenna gain of each antenna type. Then Port No. 1 shall be performed the test. ☐ EUT is consist of multiple model antennas assembly for spatial multiplexing MIMO configuration (e.g. model A shall be installed in port 1 and model B shall be installed in port 2...).					

Antenna: 3dBi Dual Band Dipole Antenna x 2 (2T2R Spatial Multiplexing MIMO configuration;
2 antennas are for signal transmitting and 2 antennas are for signal receiving)

Transmitter Outputs & Receiver Inputs Information				
Modulation	Transmitter Outputs	Receiver Inputs	Transmitter Output Signals	Co-location
802.11b/g	1	1	Correlated	No
802.11n HT20 / HT40	2 (SM)	2	Uncorrelated	No

Note 1: CDD - Cyclic Delay Diversity (CDD) modes (e.g., legacy modes in 802.11n devices). In CDD modes, the same digital data is carried by each transmit antenna, but with different cyclic delays.

Note 2: STBC - Space Time Block Codes (STBC) for which different digital data is carried by each transmit antenna during any symbol period.

Note 3: SM - Spatial Multiplexing MIMO (SM-MIMO), for which independent data streams are sent to each transmit antenna.

Note 4: Co-location, Co-location is generally defined as simultaneously transmitting (co-transmitting) antennas within 20 cm of each other.

Antenna Directional Gain (2.4GHz Band)					
Port No.	Modulation	Transmitter Outputs Signals Correlated	Transmitter Outputs (N)	Antenna Gain Combination (dBi)	Directional Gain (dBi)
1	802.11b/g	Correlated	1	2.26	2.26
1+2	802.11n HT20	Uncorrelated	2	2.26, 2.26	2.26
1+2	802.11n HT40	Uncorrelated	2	2.26, 2.26	2.26

☒ For all transmitter outputs with equal antenna gains, directional gain is to be computed as follows

- Any transmit signals are correlated, Directional Gain = $G_{ANT} + 10 \log(N)$ dBi
- All transmit signals are completely uncorrelated, Directional Gain = G_{ANT}

☐ For all transmitter outputs with unequal antenna gains, directional gain is to be computed as follows:

- Any transmit signals are correlated, Directional Gain = $10 \log[(10^{G1/10} + 10^{G2/10} + \dots + 10^{GN/10})^2 / N]$ dBi
- All transmit signals are completely uncorrelated, Directional Gain = $10 \log[(10^{G1/10} + 10^{G2/10} + \dots + 10^{GN/10}) / N]$ dBi

IEEE 802.11n Modulation Scheme

MCS	Spatial	Modulation	Coding Rate	Data rate(Mbps)	
Index	Streams	Type	Type	20 MHz channel 800nsGI	40 MHz channel 800nsGI
0	1	BPSK	1/2	6.5	13.5
1	1	QPSK	1/2	13	27
2	1	QPSK	3/4	19.5	40.5
3	1	16-QAM	1/2	26	54
4	1	16-QAM	3/4	39	81
5	1	64-QAM	2/3	52	108
6	1	64-QAM	3/4	58.5	121.5
7	1	64-QAM	5/6	65	135
8	2	BPSK	1/2	13	27
9	2	QPSK	1/2	26	54
10	2	QPSK	3/4	39	81
11	2	16-QAM	1/2	52	108
12	2	16-QAM	3/4	78	162
13	2	64-QAM	2/3	104	216
14	2	64-QAM	3/4	117	243
15	2	64-QAM	5/6	130	270

2.3 Table for Carrier Frequencies

There are two bandwidth systems for IEEE 802.11b Port 1/g/n.

For IEEE 802.11 b/g/n (20MHz) bandwidth systems use channel 1 ~ 11.

For IEEE 802.11 n (40MHz) bandwidth systems use channel 3 ~ 9.

Frequency Band	Channel No.	Frequency	Channel No.	Frequency
2400~2483.5MHz	1	2412 MHz	7	2442 MHz
	2	2417 MHz	8	2447 MHz
	3	2422 MHz	9	2452 MHz
	4	2427 MHz	10	2457 MHz
	5	2432 MHz	11	2462 MHz
	6	2437 MHz	-	-

2.4 Table for Test Modes

Preliminary tests were performed in different data rate to find the worst radiated emission. The data rate shown in the table below is the worst-case rate with respect to the specific test item. Investigation has been done on the entire possible configuration for searching the worst cases. The following table is a list of the test modes shown in this test report.

Test Items	Mode	Data Rate	Channel	Antenna Port
AC Power Line Conducted Emissions	Normal Mode	Auto	-	-
Radiated Emissions Below 1GHz Maximum Peak Output Power Power Spectral Density	11b/CCK	1 Mbps	1/6/11	1
	11g/BPSK	6 Mbps	1/6/11	
	MCS 0 (20MHz)	6.5 Mbps	1/6/11	
	MCS 0 (40MHz)	13.5 Mbps	3/6/9	1/2; 1+2
	MCS 8 (20MHz)	13 Mbps	1/6/11	
	MCS 8 (40MHz)	27 Mbps	3/6/9	
6dB Spectrum Bandwidth	11b/CCK	1 Mbps	1/6/11	1
	11g/BPSK	6 Mbps	1/6/11	
	MCS 0 (20MHz)	6.5 Mbps	1/6/11	
	MCS 0 (40MHz)	13.5 Mbps	3/6/9	1/2
	MCS 8 (20MHz)	13 Mbps	1/6/11	
	MCS 8 (40MHz)	27 Mbps	3/6/9	
Radiated Emissions Above 1GHz	11b/CCK	1 Mbps	1/6/11	1
	11g/BPSK	6 Mbps	1/6/11	
	MCS 0 (20MHz)	6.5 Mbps	1/6/11	
	MCS 0 (40MHz)	13.5 Mbps	3/6/9	1+2
	MCS 8 (20MHz)	13 Mbps	1/6/11	
	MCS 8 (40MHz)	27 Mbps	3/6/9	
Band Edge Emissions	11b/CCK	1 Mbps	1/11	1
	11g/BPSK	6 Mbps	1/11	
	MCS 0 (20MHz)	6.5 Mbps	1/11	
	MCS 0 (40MHz)	13.5 Mbps	3/9	1+2
	MCS 8 (20MHz)	13 Mbps	1/11	
	MCS 8 (40MHz)	27 Mbps	3/9	

2.5 Table for Testing Locations

Test Site No.	Site Category	Location
CO04-HY	Conduction	Hwa Ya
TH01-HY	OVEN Room	Hwa Ya
03CH02-HY	SAC	Hwa Ya

Semi Anechoic Chamber (SAC).

2.6 Table for Supporting Units

Support Unit	Brand	Model	FCC ID	Remark
Notebook	DELL	E5520	DoC	Conducted Emissions
(USB) Mouse	Microsoft	1004	DoC	
iPod Nano	Apple	A1320	R33057	
Wireless AP (Remote Workstation)	D-Link	DNS-G120	N/A	
Notebook	DELL	E5520	DoC	Radiated Emissions
(USB) Mouse	Microsoft	1004	DoC	
iPod Nano	Apple	A1199	R33057	
Wireless AP (Remote Workstation)	3COM	AP2750	O9C-AP2750	

2.7 Table for Parameters of Test Software Setting

During testing, Channel & Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

For Single Chain:

Power Parameters of IEEE 802.11b Port 1/g

Test Software Version	ART		
Frequency	2412 MHz	2437 MHz	2462 MHz
IEEE 802.11b Port 1	17.5	17.5	15
IEEE 802.11g Port 1	12.5	16	9.5

Power Parameters of IEEE 802.11n

Test Software Version	ART		
Frequency	2412 MHz	2437 MHz	2462 MHz
IEEE 802.11n	12	16	9
Frequency	2422 MHz	2437 MHz	2452 MHz
IEEE 802.11n	9	16	7

For Two Chains:

Power Parameters of IEEE 802.11n Port 1+ Port 2

Test Software Version	ART		
Frequency	2412 MHz	2437 MHz	2462 MHz
IEEE 802.11n	10.5/10.5	16/16	7.5/7.5
Frequency	2422 MHz	2437 MHz	2452 MHz
IEEE 802.11n	8/8	16/16	6/6

2.8 EUT Operation during Test

An executive program, "EMITEST.exe" under WIN 7, which generates a complete line of continuously repeating "H" pattern, was used as the test software.

The program was executed as follows:

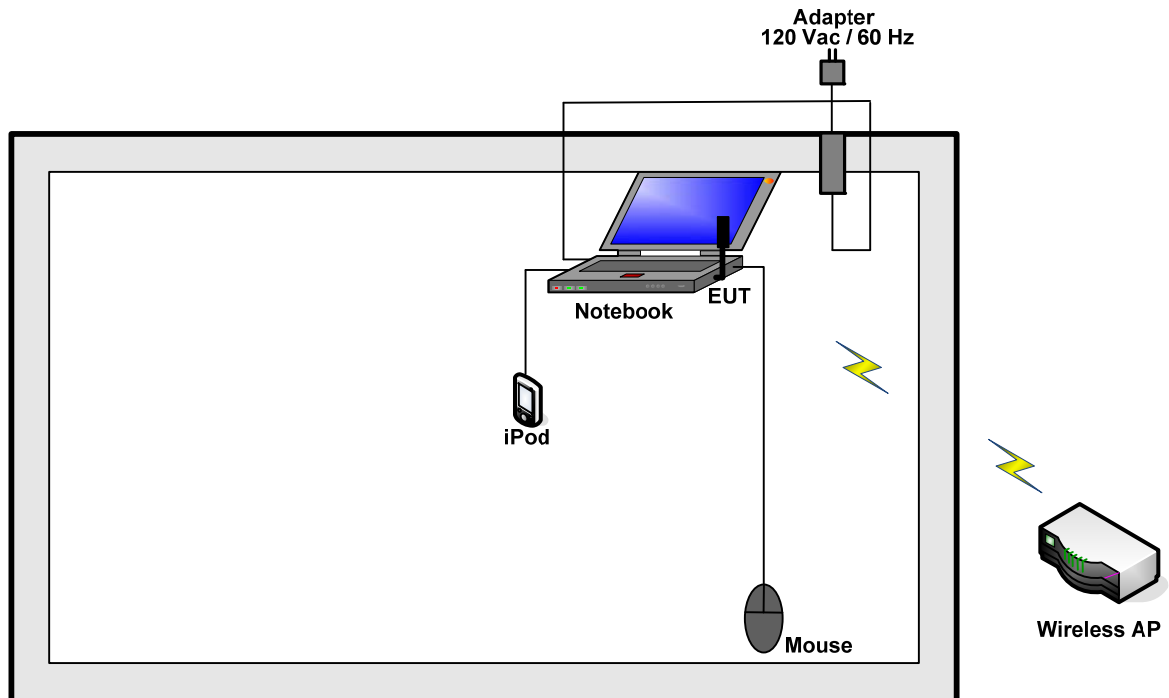
- a. Turn on the power of all equipment.
- b. The EUT reads the test program from the hard disk drive and runs it.
- c. The EUT sends "H" messages to the monitor, and the monitor displays "H" patterns on the screen.
- d. The EUT sends messages to the modem.
- e. The EUT sends "H" messages to the internal hard disk, and the hard disk reads and writes the message.
- f. Repeat the steps from c to e.

At the same time, the following programs were executed:

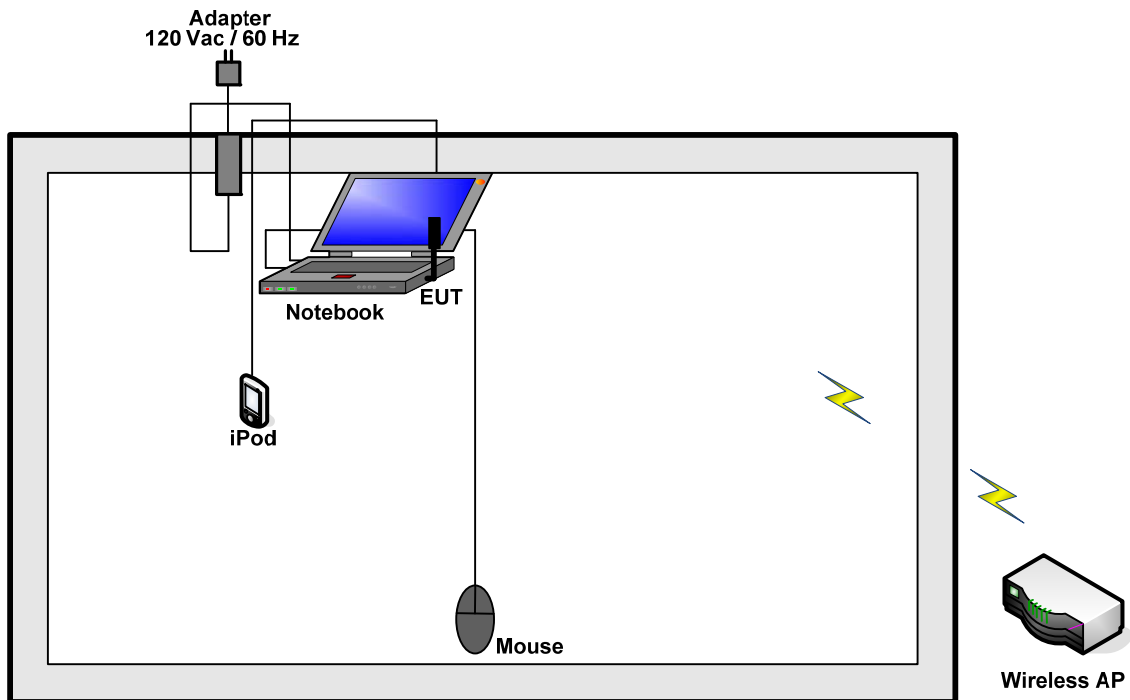
- Executed "Ping.exe" to link with the remote workstation AP to receive and transmit data via Wireless.

For Radiated Emissions :

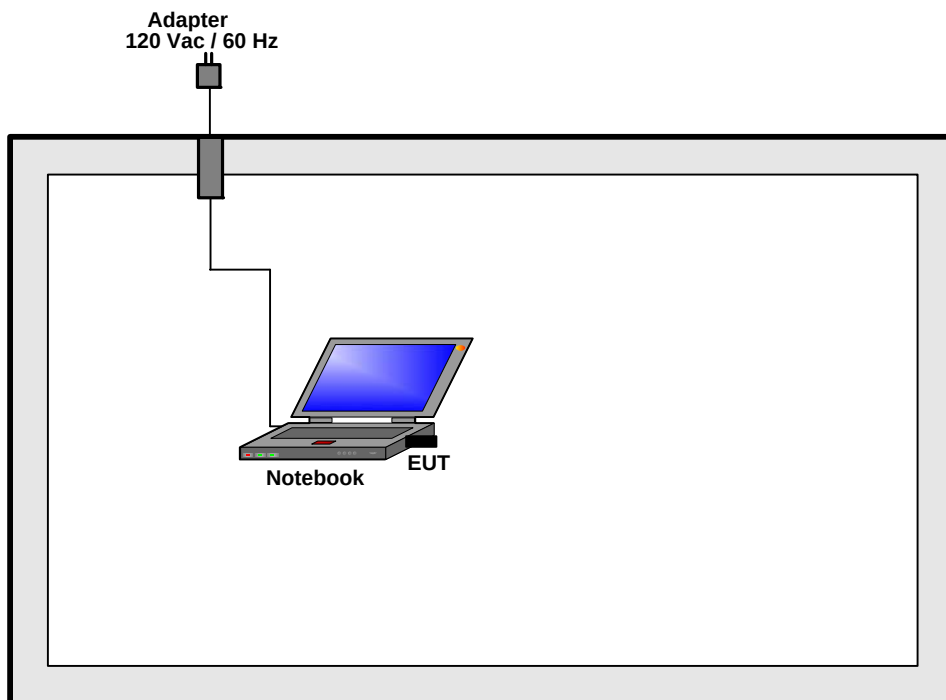
- Executed "ART" to keep transmitting signals at fixed frequency.

2.9 Test Configuration**For conducted emissions**

For radiated emissions 9kHz~1GHz



For radiated emissions above 1GHz



3 TEST RESULT

3.1 AC Power Line Conducted Emissions Measurement

3.1.1 Limit

For this product which is designed to be connected to the AC power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed below limits table.

Class B

Frequency (MHz)	QP Limit (dBuV)	AV Limit (dBuV)
0.15~0.5	66~56	56~46
0.5~5	56	46
5~30	60	50

3.1.2 Measuring Instruments and Setting

Please refer to section 4 of equipments list in this report. The following table is the setting of the receiver.

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 KHz

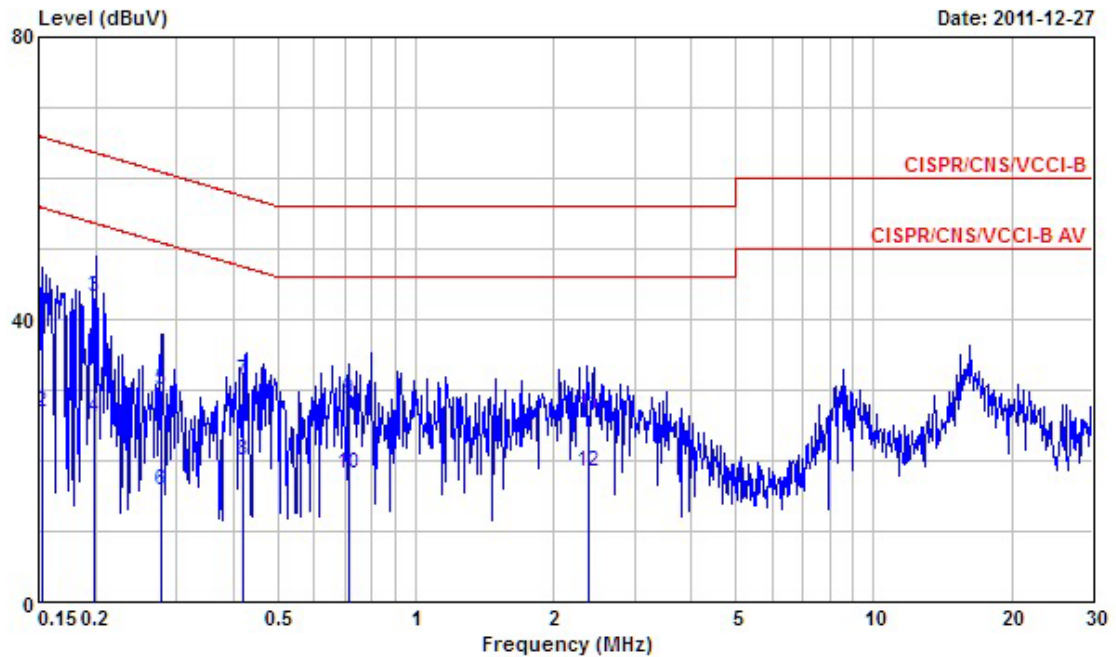
3.1.3 Test Procedures

1. The EUT warm up about 15 minutes then start test.
2. Configure the EUT according to ANSI C63.4. The EUT or host of EUT has to be placed 0.4 meter far from the conducting wall of the shielding room and at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT or host of EUT to the power mains through a line impedance stabilization network (LISN).
4. All the support units are connected to the other LISNs. The LISN should provide 50uH/50ohms coupling impedance.
5. The frequency range from 150 KHz to 30 MHz was searched.
6. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
7. The measurement has to be done between each power line and ground at the power terminal.

3.1.7 Results of AC Power Line Conducted Emissions Measurement

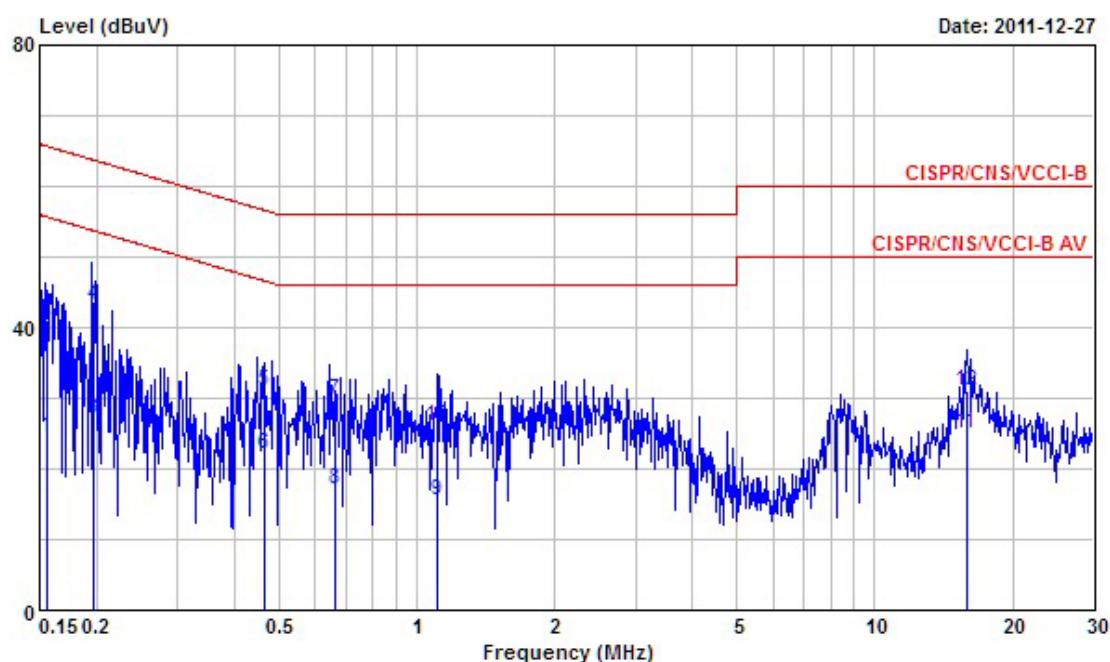
Final Test Date	Dec. 27, 2011	Test Site No.	CO04-HY
Temperature	24.5°C	Humidity	48%
Test Engineer	Assen	Configuration	Normal Mode

Line



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.1532130	41.88	-23.94	65.82	41.48	0.30	0.10	QP
2	0.1532130	26.91	-28.91	55.82	26.51	0.30	0.10	Average
3	0.1979970	43.07	-20.62	63.69	42.67	0.30	0.10	QP
4	0.1979970	26.08	-27.61	53.69	25.68	0.30	0.10	Average
5	0.2773390	29.98	-30.92	60.90	29.58	0.30	0.10	QP
6	0.2773390	15.82	-35.08	50.90	15.42	0.30	0.10	Average
7	0.4198600	31.39	-26.06	57.45	31.00	0.29	0.10	QP
8	0.4198600	19.95	-27.50	47.45	19.56	0.29	0.10	Average
9	0.7121870	28.61	-27.39	56.00	28.22	0.29	0.10	QP
10	0.7121870	18.03	-27.97	46.00	17.64	0.29	0.10	Average
11	2.389	26.70	-29.30	56.00	26.31	0.32	0.07	QP
12	2.389	18.39	-27.61	46.00	18.00	0.32	0.07	Average

Neutral



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.1554020	24.37	-31.34	55.71	24.00	0.27	0.10	Average
2	0.1554020	41.07	-24.64	65.71	40.70	0.27	0.10	QP
3	0.1972480	27.02	-26.71	53.73	26.67	0.25	0.10	Average
4	0.1972480	43.04	-20.69	63.73	42.69	0.25	0.10	QP
5	0.4626650	31.07	-25.57	56.64	30.73	0.24	0.10	QP
6	0.4626650	22.05	-24.59	46.64	21.71	0.24	0.10	Average
7	0.6603580	29.64	-26.36	56.00	29.29	0.25	0.10	QP
8	0.6603580	17.12	-28.88	46.00	16.77	0.25	0.10	Average
9	1.110	15.62	-30.38	46.00	15.27	0.25	0.10	Average
10	1.110	25.92	-30.08	56.00	25.57	0.25	0.10	QP
11	15.890	25.00	-25.00	50.00	24.47	0.45	0.08	Average
12	15.890	31.01	-28.99	60.00	30.48	0.45	0.08	QP

Note:

Level = Read Level + LISN Factor + Cable Loss.

3.2 Maximum Peak Output Power Measurement

3.2.1 Limit

For systems using digital modulation in the 2400-2483.5MHz, the limit for peak output power is 30dBm. The limited has to be reduced by the amount in dB that the gain of the antenna exceed 6dBi. In case of point-to-multipoint antenna reduction operation, the limit has to be reduced by 1dB for every dB that the directional gain of the antenna exceeds 6dBi.

3.2.2 Measuring Instruments and Setting

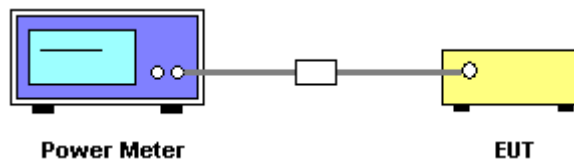
Please refer to section 4 of equipments list in this report. The following table is the setting of the power meter.

Power Meter Parameter	Setting
Filter No.	Auto
Measurement time	0.135 s ~ 26 s
Used Peak Sensor	MA2411B

3.2.3 Test Procedures

1. The transmitter output (antenna port) was connected to the power meter.
2. Turn on the EUT and power meter and then record the peak power value.
3. Repeat above procedures on all channels needed to be tested.
4. When measuring maximum conducted output power within multiple antenna systems, add every result of the values by mathematic formula. (Only for IEEE 802.11n test)

3.2.4 Test Setup Layout



3.2.5 Test Deviation

There is no deviation with the original standard.

3.2.6 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

3.2.7 Test Result of Maximum Peak Output Power

Final Test Date	Dec. 01, 2011	Test Site No.	TH01-HY
Temperature	23.3~23.8℃	Humidity	37~65%
Test Engineer	Ian	Configurations	802.11b/g/n

MAC:4C-ED-DE-90-36-E1

For Single Chain:

Configuration IEEE 802.11b Port 1

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	19.57	30.00	Complies
6	2437 MHz	19.45	30.00	Complies
11	2462 MHz	13.74	30.00	Complies

Configuration IEEE 802.11g Port 1

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	20.64	30.00	Complies
6	2437 MHz	23.73	30.00	Complies
11	2462 MHz	19.23	30.00	Complies

Configuration of IEEE 802.11n Port 1 (20MHz)

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	20.32	30.00	Complies
6	2437 MHz	23.85	30.00	Complies
11	2462 MHz	19.24	30.00	Complies

Configuration of IEEE 802.11n Port 1 (40MHz)

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
3	2422 MHz	18.58	30.00	Complies
6	2437 MHz	23.52	30.00	Complies
9	2452 MHz	16.03	30.00	Complies

For Two Chains:**Configuration of IEEE 802.11n Port 1 (20MHz)**

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	19.78	30.00	Complies
6	2437 MHz	23.72	30.00	Complies
11	2462 MHz	17.15	30.00	Complies

Configuration of IEEE 802.11n Port 2 (20MHz)

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	20.38	30.00	Complies
6	2437 MHz	23.61	30.00	Complies
11	2462 MHz	17.42	30.00	Complies

Configuration of IEEE 802.11n Port 1+ Port 2 (20MHz)

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	23.10	30.00	Complies
6	2437 MHz	26.68	30.00	Complies
11	2462 MHz	20.30	30.00	Complies

Configuration of IEEE 802.11n Port 1 (40MHz)

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
3	2422 MHz	18.45	30.00	Complies
6	2437 MHz	23.31	30.00	Complies
9	2452 MHz	15.58	30.00	Complies

Configuration of IEEE 802.11n Port 2 (40MHz)

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
3	2422 MHz	19.17	30.00	Complies
6	2437 MHz	23.04	30.00	Complies
9	2452 MHz	16.28	30.00	Complies

Configuration of IEEE 802.11n Port 1+ Port 2 (40MHz)

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
3	2422 MHz	21.84	30.00	Complies
6	2437 MHz	26.19	30.00	Complies
9	2452 MHz	18.95	30.00	Complies

3.3 Power Spectral Density Measurement

3.3.1 Limit

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

3.3.2 Measuring Instruments and Setting

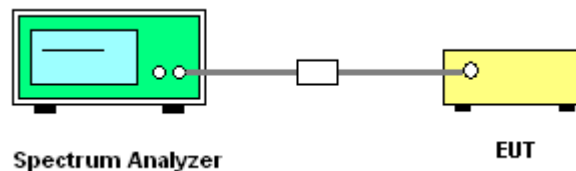
Please refer to section 4 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	1.5MHz
RB	3 kHz
VB	30 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	500s

3.3.3 Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. Set RBW of spectrum analyzer to 3kHz and VBW to 30kHz. Set Detector to Peak, Trace to Max Hold.
3. Mark the frequency with maximum peak power as the center of the display of the spectrum.
4. Set the span to 1.5MHz and the sweep time to 500s and record the maximum peak value.
5. When measuring maximum conducted output power within multiple antenna systems, add every result of the values by mathematic formula. (Only for IEEE 802.11n test)

3.3.4 Test Setup Layout



3.3.5 Test Deviation

There is no deviation with the original standard.

3.3.6 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

3.3.7 Test Result of Power Spectral Density

Final Test Date	Dec. 09, 2011	Test Site No.	TH01-HY
Temperature	23.3~23.8℃	Humidity	37~65%
Test Engineer	Ian	Configurations	802.11b/g/n

For Single Chain:

Configuration IEEE 802.11b Port 1

Channel	Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	-6.65	8.00	Complies
6	2437 MHz	-6.10	8.00	Complies
11	2462 MHz	-3.83	8.00	Complies

Configuration IEEE 802.11g Port 1

Channel	Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	-14.09	8.00	Complies
6	2437 MHz	-1.96	8.00	Complies
11	2462 MHz	-14.84	8.00	Complies

Configuration of IEEE 802.11n Port 1 (20MHz)

Channel	Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	-12.23	8.00	Complies
6	2437 MHz	-2.43	8.00	Complies
11	2462 MHz	-10.95	8.00	Complies

Configuration of IEEE 802.11n Port 1 (40MHz)

Channel	Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
3	2422 MHz	-17.85	8.00	Complies
6	2437 MHz	-6.59	8.00	Complies
9	2452 MHz	-13.14	8.00	Complies

For Two Chains:**Configuration of IEEE 802.11n Port 1 (20MHz)**

Channel	Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	-14.78	8.00	Complies
6	2437 MHz	-4.40	8.00	Complies
11	2462 MHz	-11.97	8.00	Complies

Configuration of IEEE 802.11n Port 2 (20MHz)

Channel	Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	-6.95	8.00	Complies
6	2437 MHz	-1.52	8.00	Complies
11	2462 MHz	-11.60	8.00	Complies

Configuration of IEEE 802.11n Port 1+ Port 2 (20MHz)

Channel	Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	-6.29	8.00	Complies
6	2437 MHz	0.28	8.00	Complies
11	2462 MHz	-8.77	8.00	Complies

Configuration of IEEE 802.11n Port 1 (40MHz)

Channel	Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
3	2422 MHz	-17.12	8.00	Complies
6	2437 MHz	-6.72	8.00	Complies
9	2452 MHz	-14.77	8.00	Complies

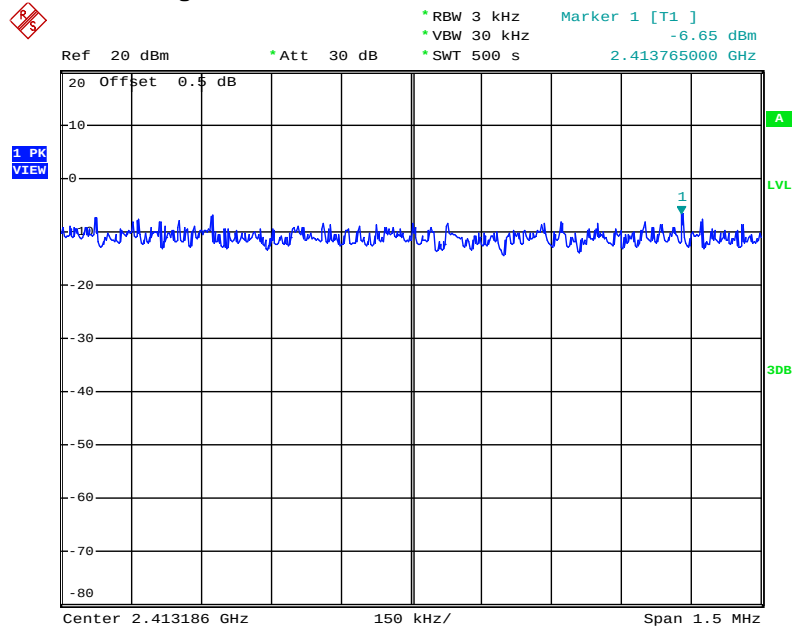
Configuration of IEEE 802.11n Port 2 (40MHz)

Channel	Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
3	2422 MHz	-14.93	8.00	Complies
6	2437 MHz	-0.95	8.00	Complies
9	2452 MHz	-10.93	8.00	Complies

Configuration of IEEE 802.11n Port 1+ Port 2 (40MHz)

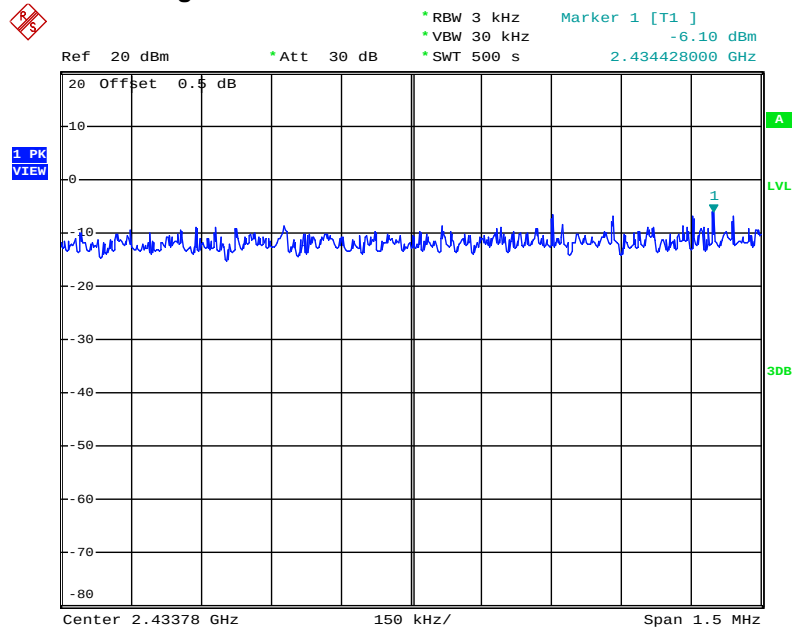
Channel	Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
3	2422 MHz	-12.88	8.00	Complies
6	2437 MHz	0.07	8.00	Complies
9	2452 MHz	-9.43	8.00	Complies

For Single Chain:
Power Density Plot on Configuration IEEE 802.11b Port 1 / 2412 MHz



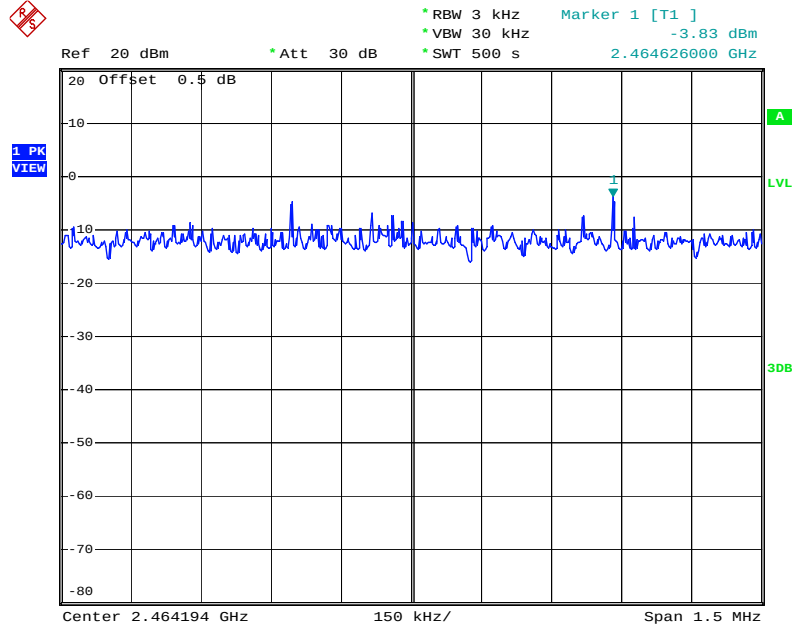
Date: 1.DEC.2011 14:21:45

Power Density Plot on Configuration IEEE 802.11b Port 1 / 2437 MHz



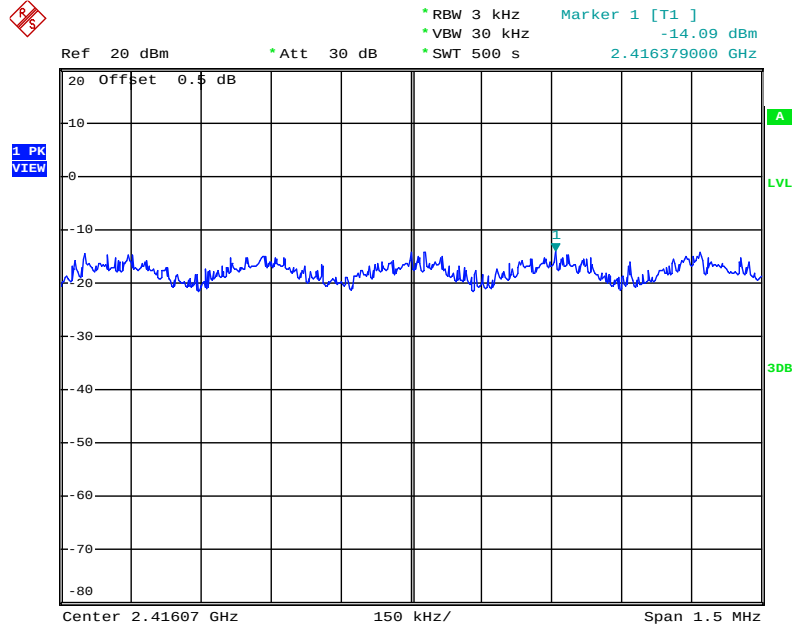
Date: 1.DEC.2011 14:25:15

Power Density Plot on Configuration IEEE 802.11b Port 1 / 2462 MHz



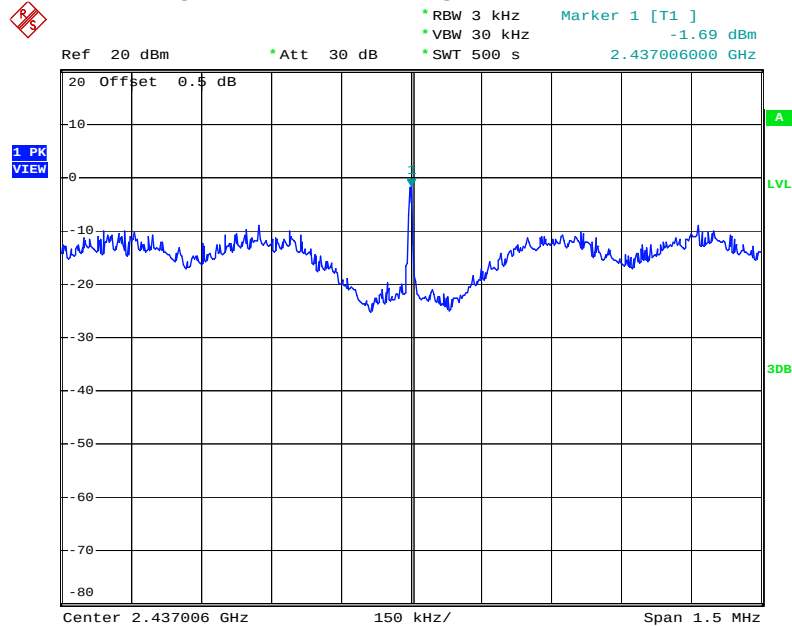
Date: 9.DEC.2011 19:45:11

Power Density Plot on Configuration IEEE 802.11g Port 1 / 2412 MHz



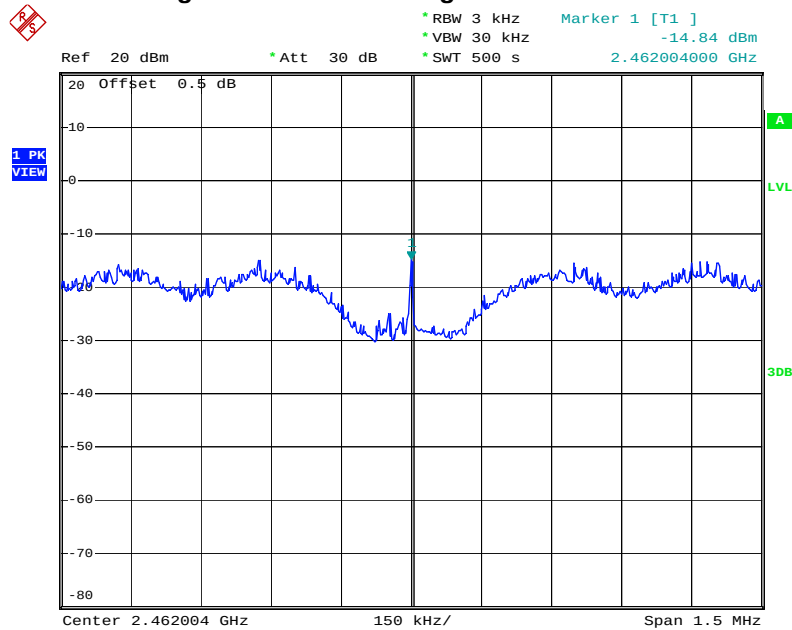
Date: 1.DEC.2011 14:50:00

Power Density Plot on Configuration IEEE 802.11g Port 1 / 2437 MHz



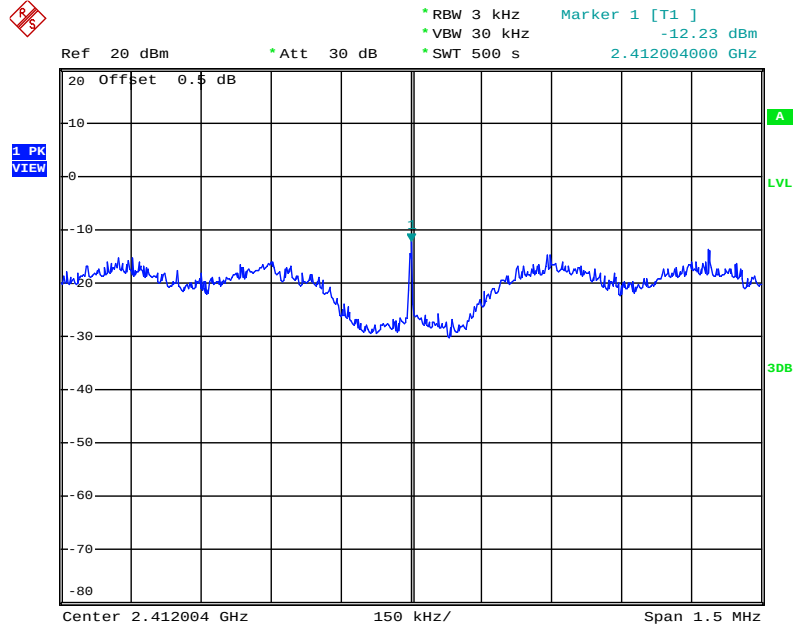
Date: 9.DEC.2011 19:36:50

Power Density Plot on Configuration IEEE 802.11g Port 1 / 2462 MHz



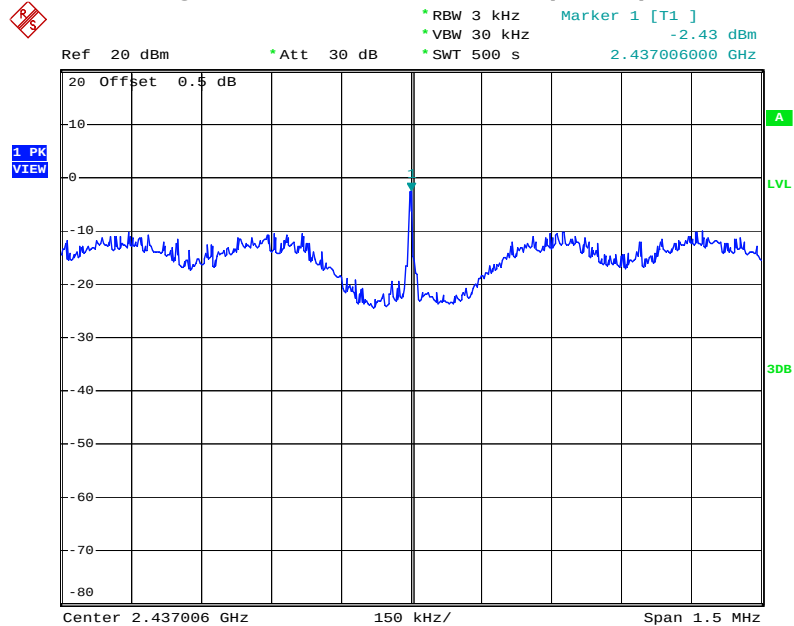
Date: 9.DEC.2011 19:40:16

Power Density Plot on Configuration IEEE 802.11n Port 1 (20MHz) / 2412 MHz



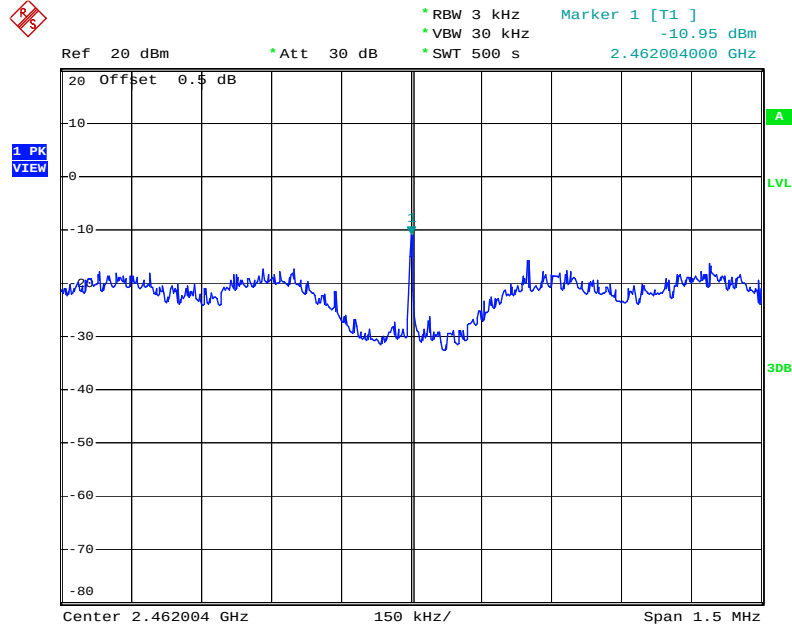
Date: 1.DEC.2011 15:39:32

Power Density Plot on Configuration IEEE 802.11n Port 1 (20MHz) / 2437 MHz



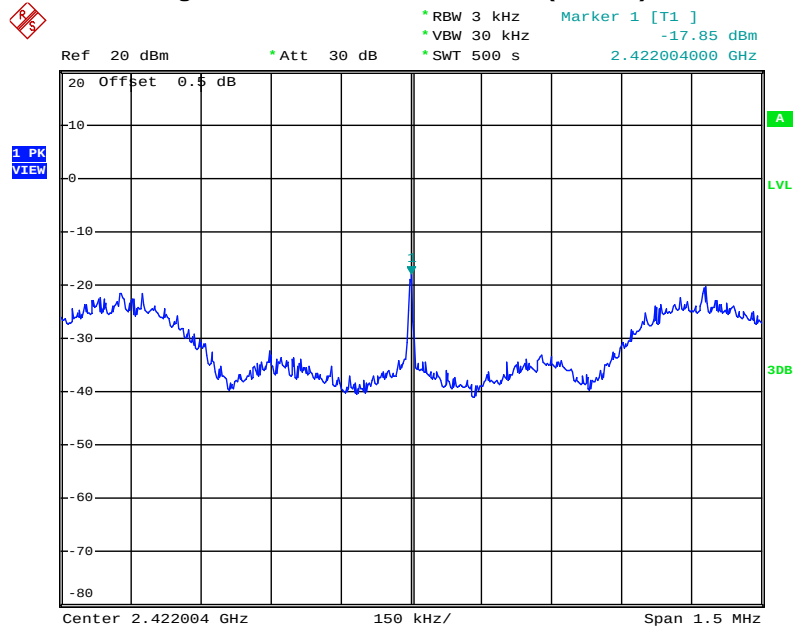
Date: 9.DEC.2011 19:49:03

Power Density Plot on Configuration IEEE 802.11n Port 1 (20MHz) / 2462 MHz



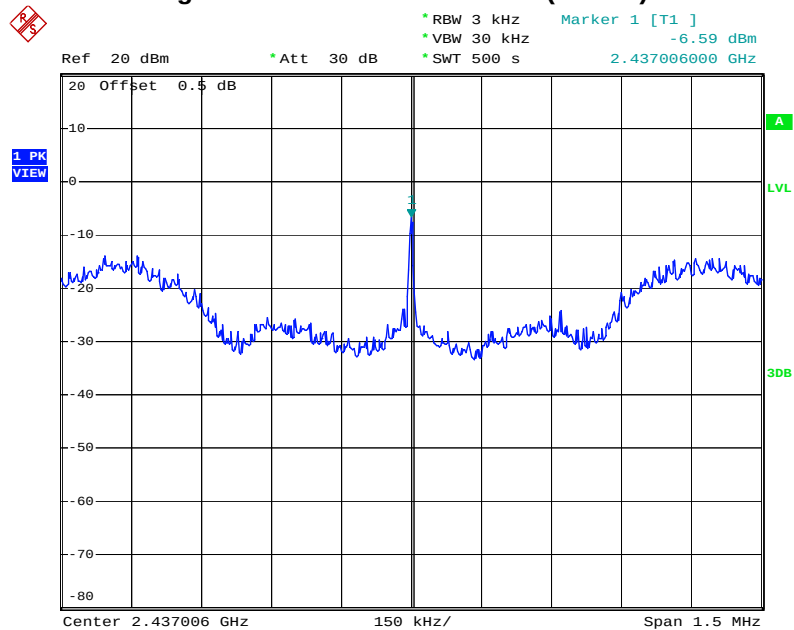
Date: 9.DEC.2011 19:59:16

Power Density Plot on Configuration IEEE 802.11n Port 1 (40MHz) / 2422 MHz



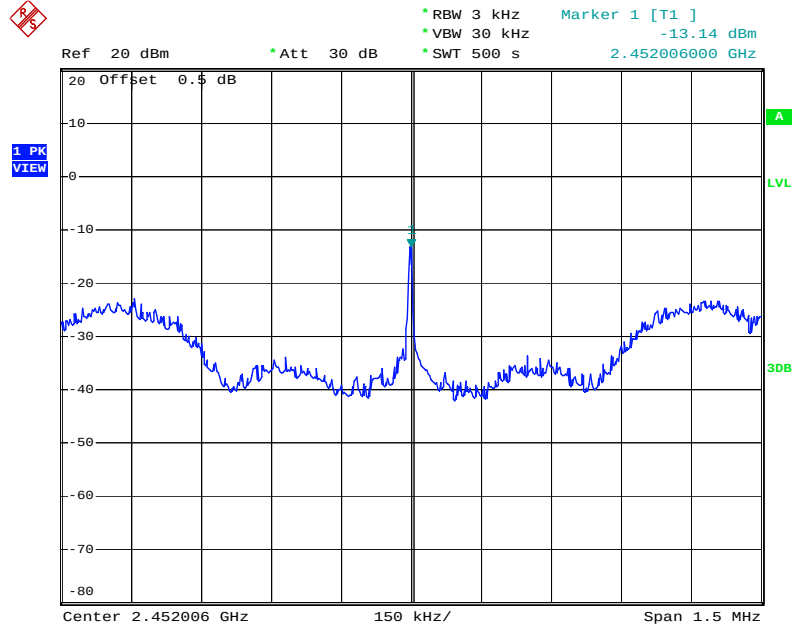
Date: 1.DEC.2011 16:07:11

Power Density Plot on Configuration IEEE 802.11n Port 1 (40MHz) / 2437 MHz



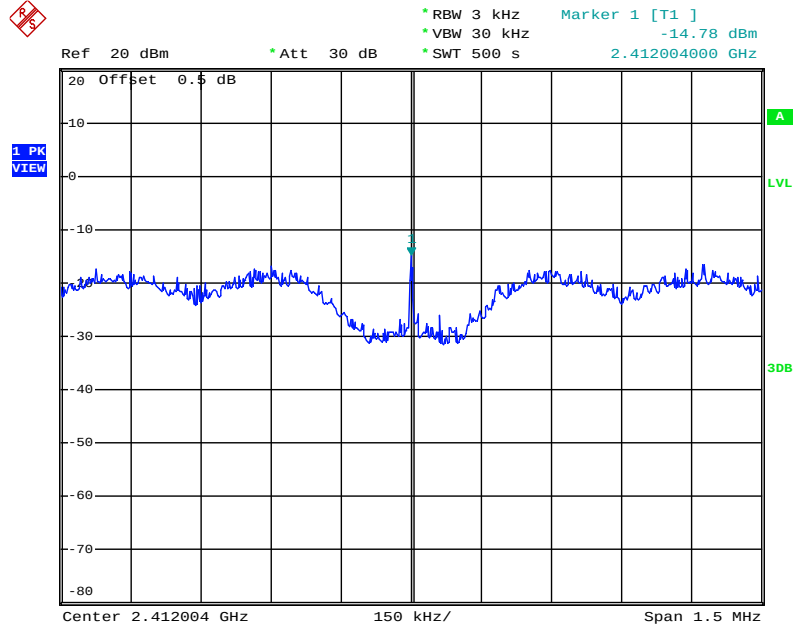
Date: 9.DEC.2011 21:07:03

Power Density Plot on Configuration IEEE 802.11n Port 1 (40MHz) / 2452 MHz



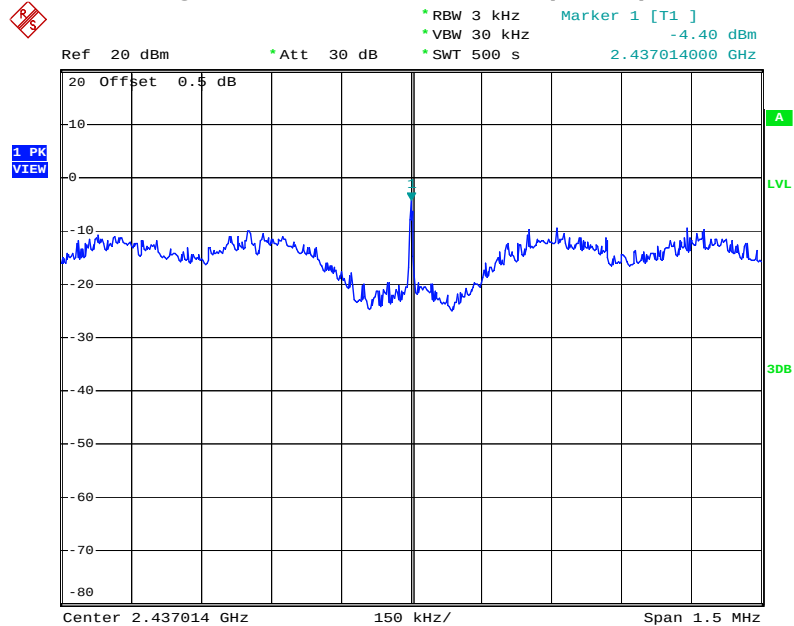
Date: 9.DEC.2011 19:56:31

For Two Chains:
Power Density Plot on Configuration IEEE 802.11n Port 1 (20MHz) Port 1 / 2412 MHz



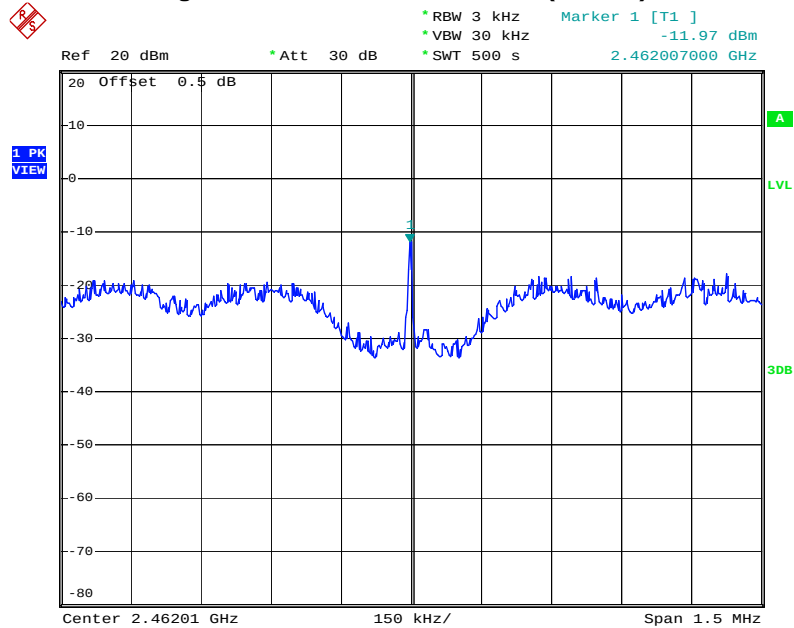
Date: 1.DEC.2011 17:15:49

Power Density Plot on Configuration IEEE 802.11n Port 1 (20MHz) Port 1 / 2437 MHz



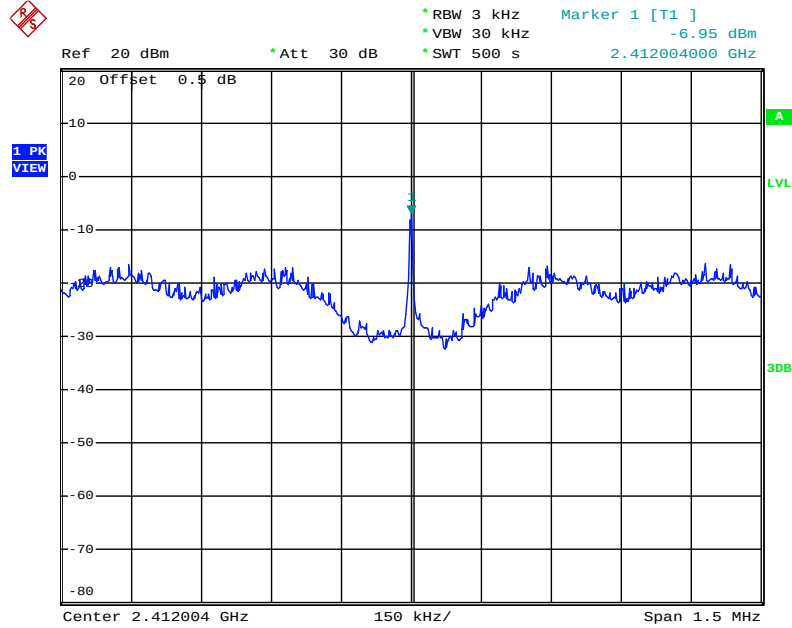
Date: 9.DEC.2011 20:30:57

Power Density Plot on Configuration IEEE 802.11n Port 1 (20MHz) Port 1 / 2462 MHz



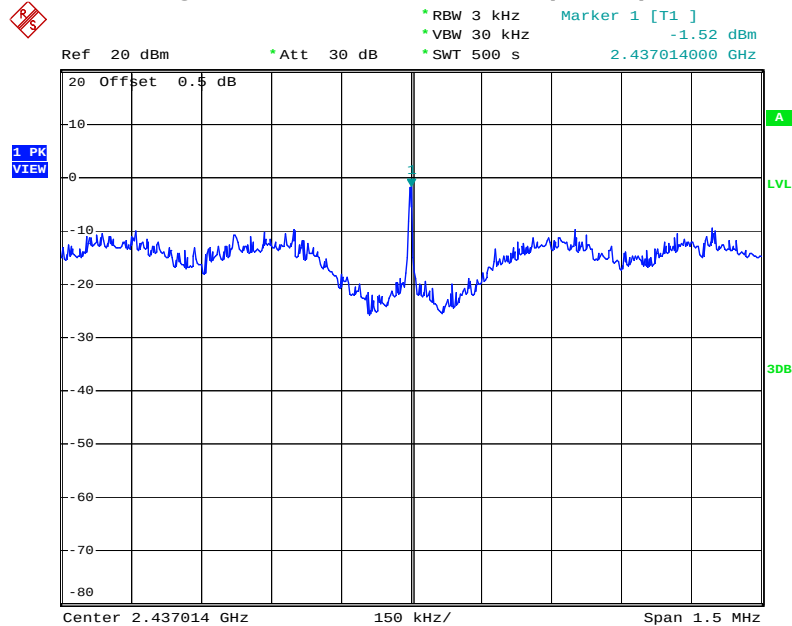
Date: 9.DEC.2011 20:17:39

Power Density Plot on Configuration IEEE 802.11n Port 1 (20MHz) Port 2 / 2412 MHz



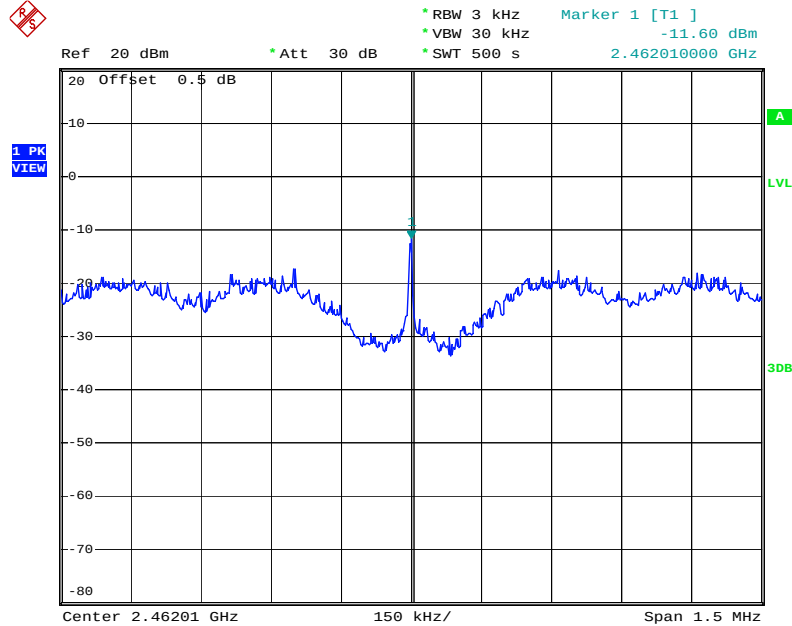
Date: 1.DEC.2011 17:18:47

Power Density Plot on Configuration IEEE 802.11n Port 1 (20MHz) Port 2 / 2437 MHz



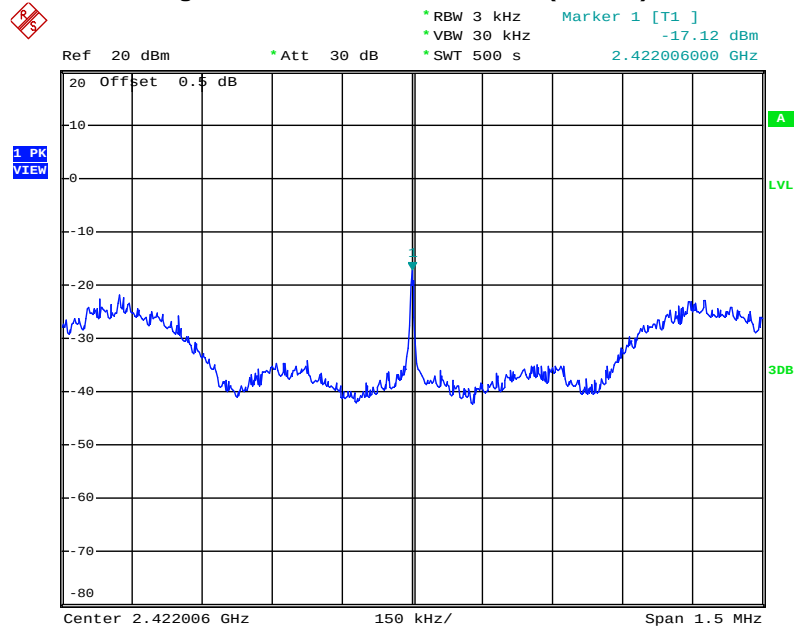
Date: 9.DEC.2011 20:26:31

Power Density Plot on Configuration IEEE 802.11n Port 1 (20MHz) Port 2 / 2462 MHz



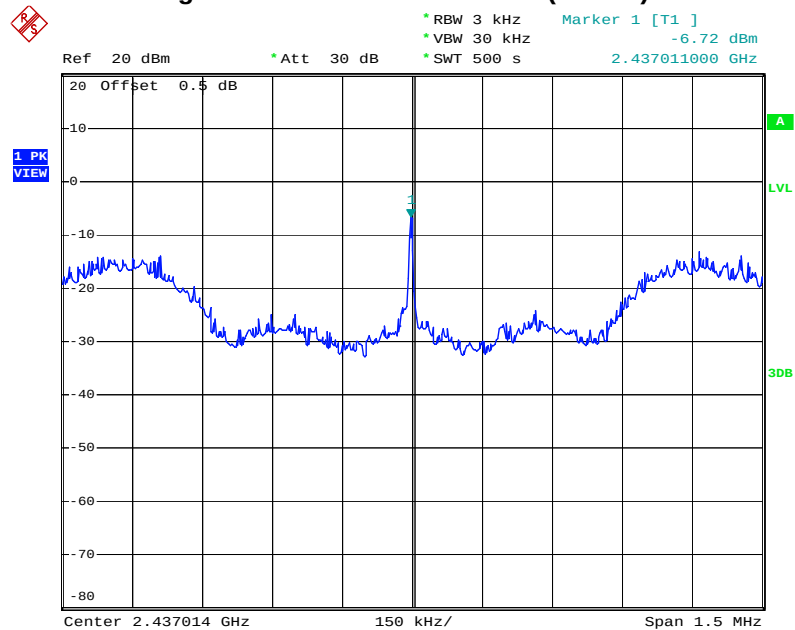
Date: 9.DEC.2011 20:21:10

Power Density Plot on Configuration IEEE 802.11n Port 1 (40MHz) Port 1 / 2422 MHz



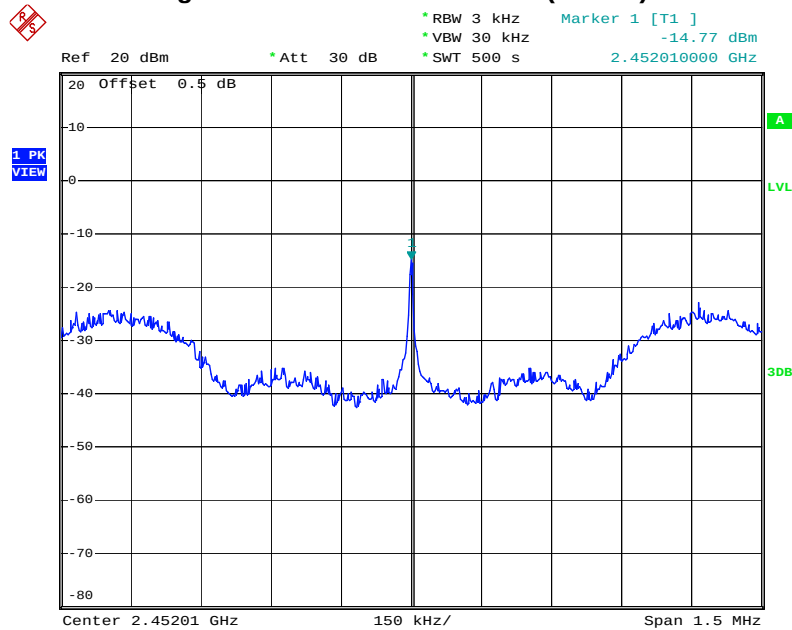
Date: 1.DEC.2011 20:09:34

Power Density Plot on Configuration IEEE 802.11n Port 1 (40MHz) Port 1 / 2437 MHz



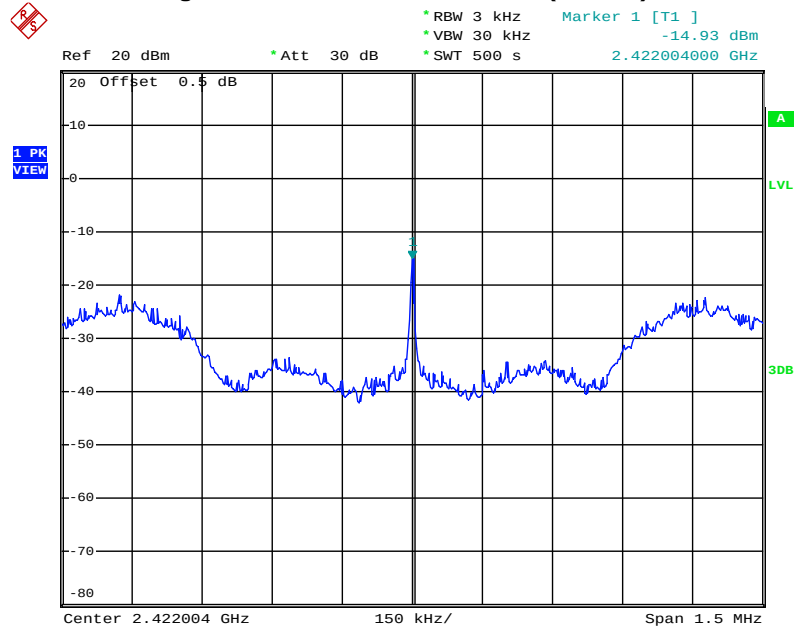
Date: 9.DEC.2011 20:49:29

Power Density Plot on Configuration IEEE 802.11n Port 1 (40MHz) Port 1 / 2452 MHz



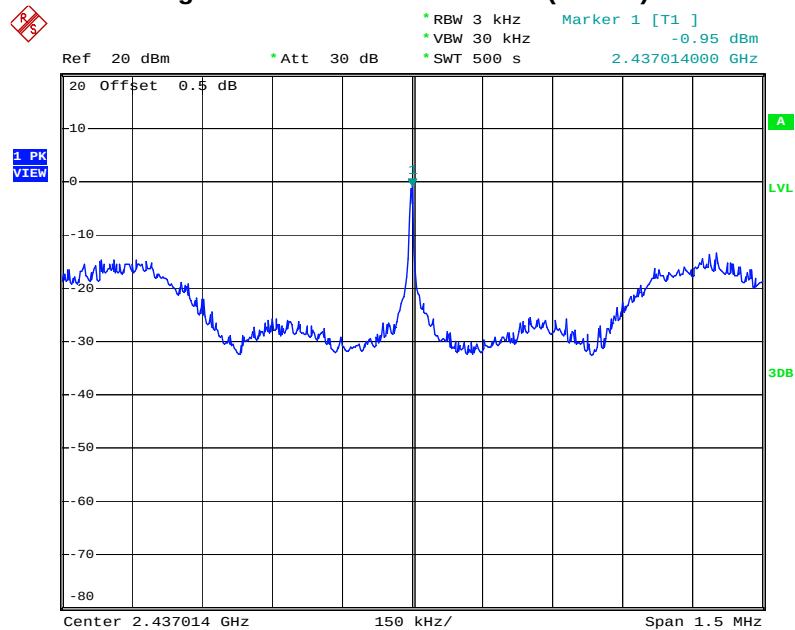
Date: 9.DEC.2011 20:42:44

Power Density Plot on Configuration IEEE 802.11n Port 1 (40MHz) Port 2 / 2422 MHz



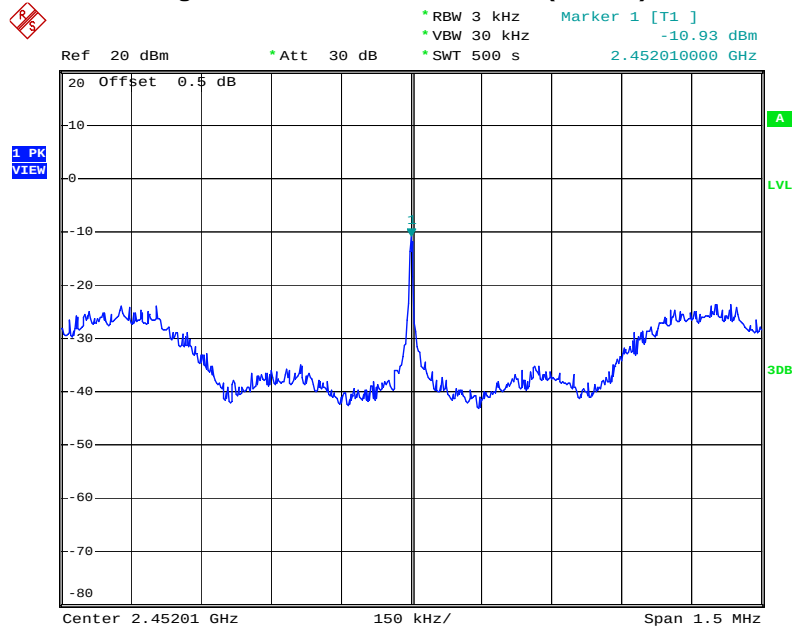
Date: 1.DEC.2011 19:46:35

Power Density Plot on Configuration IEEE 802.11n Port 1 (40MHz) Port 2 / 2437 MHz



Date: 9.DEC.2011 20:51:45

Power Density Plot on Configuration IEEE 802.11n Port 1 (40MHz) Port 2 / 2452 MHz



Date: 9.DEC.2011 20:45:52

3.4 6dB Spectrum Bandwidth Measurement

3.4.1 Limit

For digital modulation systems, the minimum 6dB bandwidth shall be at least 500 kHz.

3.4.2 Measuring Instruments and Setting

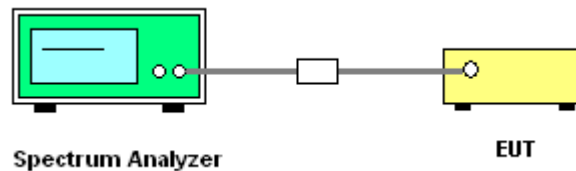
Please refer to section 4 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> 6dB Bandwidth
RB	100 kHz
VB	300 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

3.4.3 Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer in peak hold mode.
2. For 6dB Bandwidth the resolution bandwidth of 100 kHz and the video bandwidth of 300 kHz were used.
3. Measured the spectrum width with power higher than 6dB below carrier.
4. For 99% Occupied Bandwidth the resolution Bandwidth of 100 kHz and the video bandwidth of 300 kHz were used.

3.4.4 Test Setup Layout



3.4.5 Test Deviation

There is no deviation with the original standard.

3.4.6 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

3.4.7 Test Result of 6dB Spectrum Bandwidth

Final Test Date	Dec. 09, 2011	Test Site No.	TH01-HY
Temperature	23.3~23.8℃	Humidity	37~65%
Test Engineer	Ian	Configurations	802.11b/g/n

For Single Chain:

Configuration IEEE 802.11b Port 1

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	12.20	15.44	500	Complies
6	2437 MHz	12.44	15.40	500	Complies
11	2462 MHz	12.16	15.40	500	Complies

Configuration IEEE 802.11g Port 1

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	16.40	16.52	500	Complies
6	2437 MHz	16.36	16.56	500	Complies
11	2462 MHz	16.40	16.56	500	Complies

Configuration of IEEE 802.11n Port 1 (20MHz)

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	17.60	17.72	500	Complies
6	2437 MHz	17.60	17.72	500	Complies
11	2462 MHz	17.60	17.72	500	Complies

Configuration of IEEE 802.11n Port 1 (40MHz)

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
3	2422 MHz	35.84	36.16	500	Complies
6	2437 MHz	36.08	36.16	500	Complies
9	2452 MHz	36.08	36.16	500	Complies

For Two Chains:**Configuration of IEEE 802.11n Port 1 (20MHz)**

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	17.60	17.72	500	Complies
6	2437 MHz	17.64	17.72	500	Complies
11	2462 MHz	17.64	17.72	500	Complies

Configuration of IEEE 802.11n Port 2 (20MHz)

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	17.64	17.72	500	Complies
6	2437 MHz	17.72	17.76	500	Complies
11	2462 MHz	17.80	17.72	500	Complies

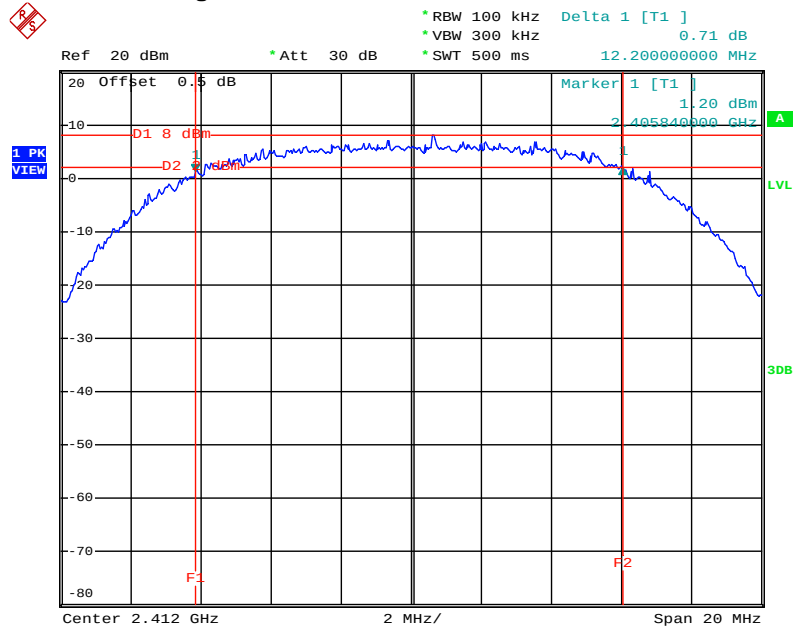
Configuration of IEEE 802.11n Port 1 (40MHz)

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
3	2422 MHz	36.08	36.16	500	Complies
6	2437 MHz	36.08	36.08	500	Complies
9	2452 MHz	36.32	36.08	500	Complies

Configuration of IEEE 802.11n Port 2 (40MHz)

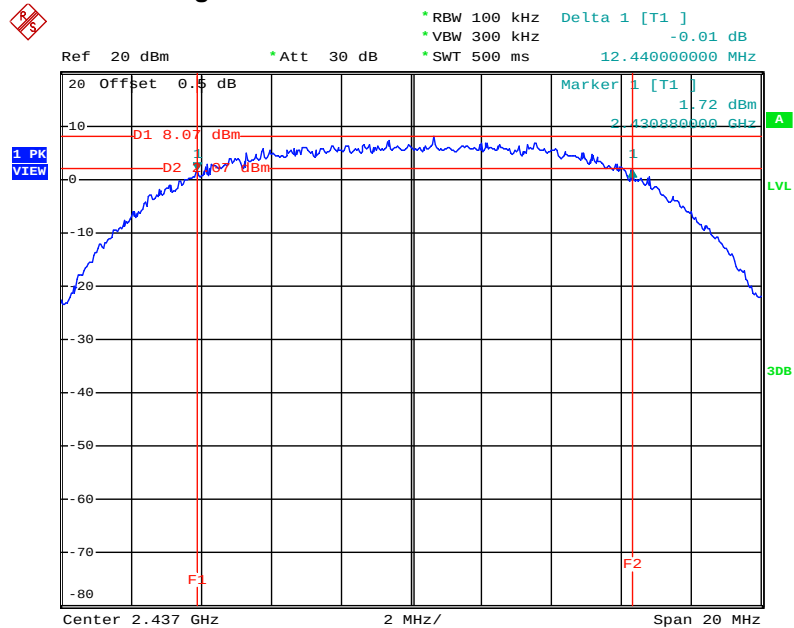
Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
3	2422 MHz	36.32	36.24	500	Complies
6	2437 MHz	36.16	36.16	500	Complies
9	2452 MHz	35.92	36.16	500	Complies

For Single Chain:
6 dB Bandwidth Plot on Configuration IEEE 802.11b Port 1 / 2412 MHz

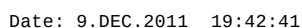


Date: 1.DEC.2011 14:19:13

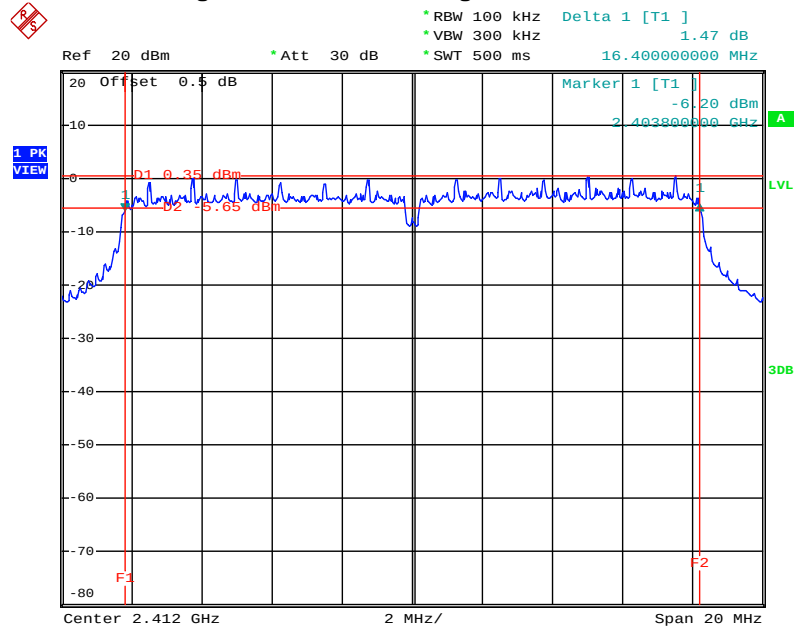
6 dB Bandwidth Plot on Configuration IEEE 802.11b Port 1 / 2437 MHz



Date: 1.DEC.2011 14:23:26

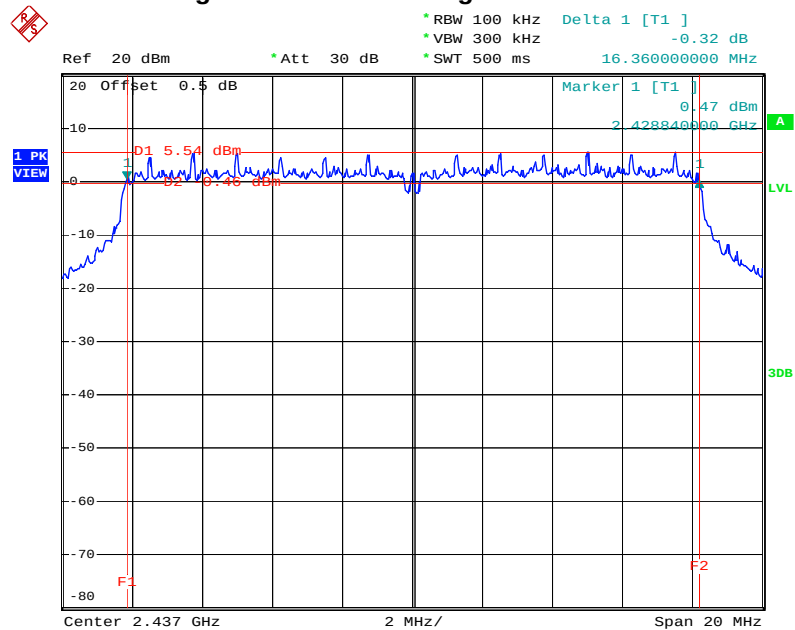


6 dB Bandwidth Plot on Configuration IEEE 802.11g Port 1 / 2412 MHz



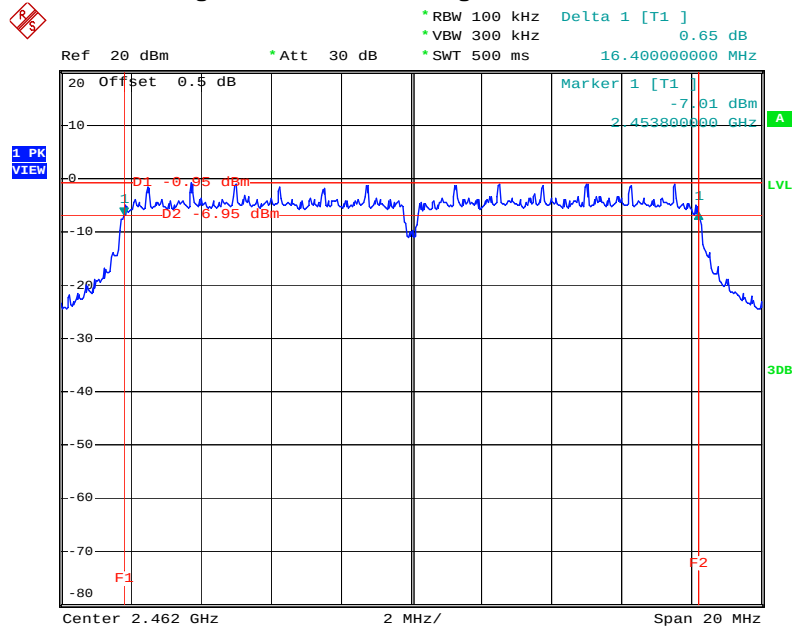
Date: 1.DEC.2011 14:47:35

6 dB Bandwidth Plot on Configuration IEEE 802.11g Port 1 / 2437 MHz



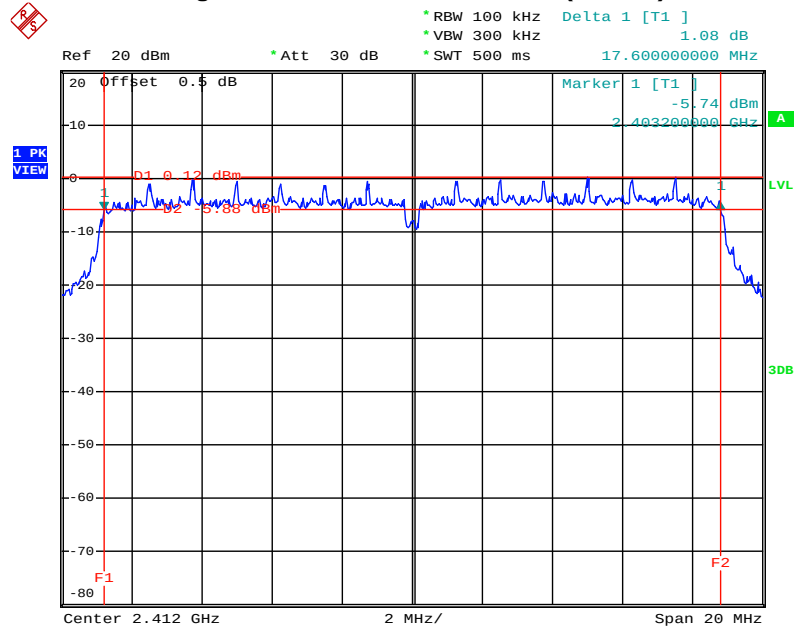
Date: 9.DEC.2011 19:35:49

6 dB Bandwidth Plot on Configuration IEEE 802.11g Port 1 / 2462 MHz



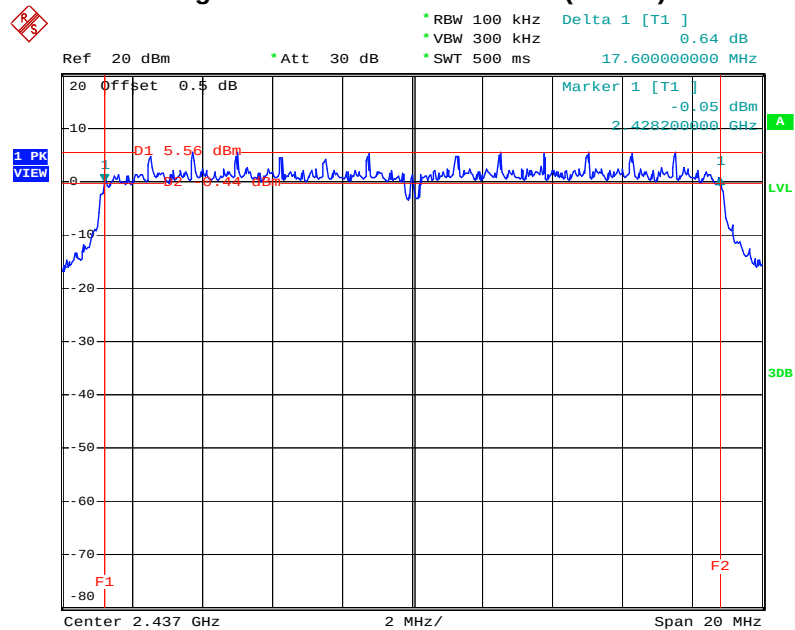
Date: 9.DEC.2011 19:30:40

6 dB Bandwidth Plot on Configuration IEEE 802.11n Port 1 (20MHz) / 2412 MHz



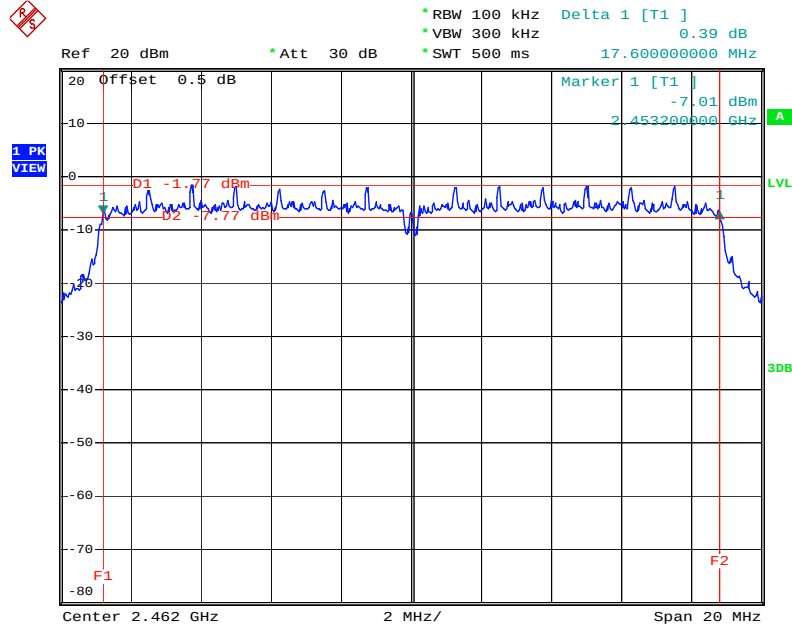
Date: 1.DEC.2011 15:37:41

6 dB Bandwidth Plot on Configuration IEEE 802.11n Port 1 (20MHz) / 2437 MHz



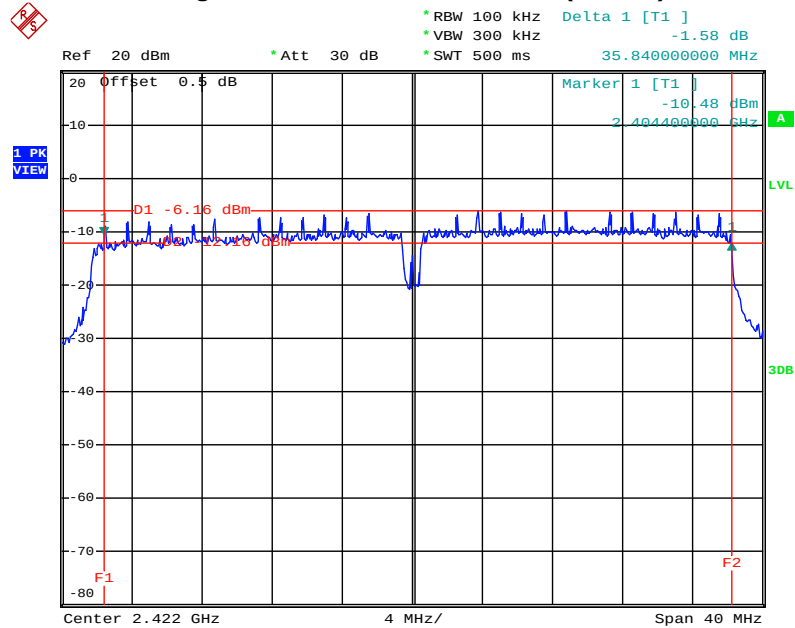
Date: 9.DEC.2011 19:48:05

6 dB Bandwidth Plot on Configuration IEEE 802.11n Port 1 (20MHz) / 2462 MHz



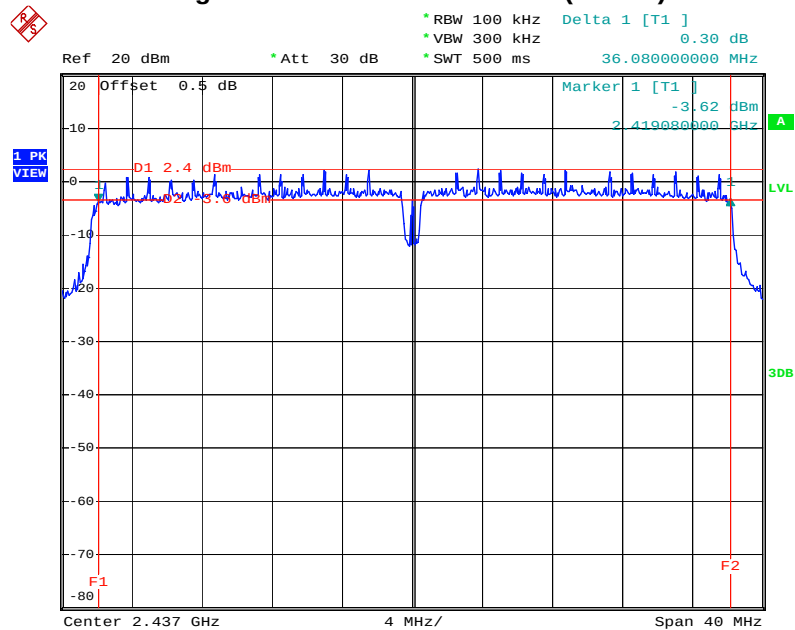
Date: 9.DEC.2011 19:51:11

6 dB Bandwidth Plot on Configuration IEEE 802.11n Port 1 (40MHz) / 2422 MHz



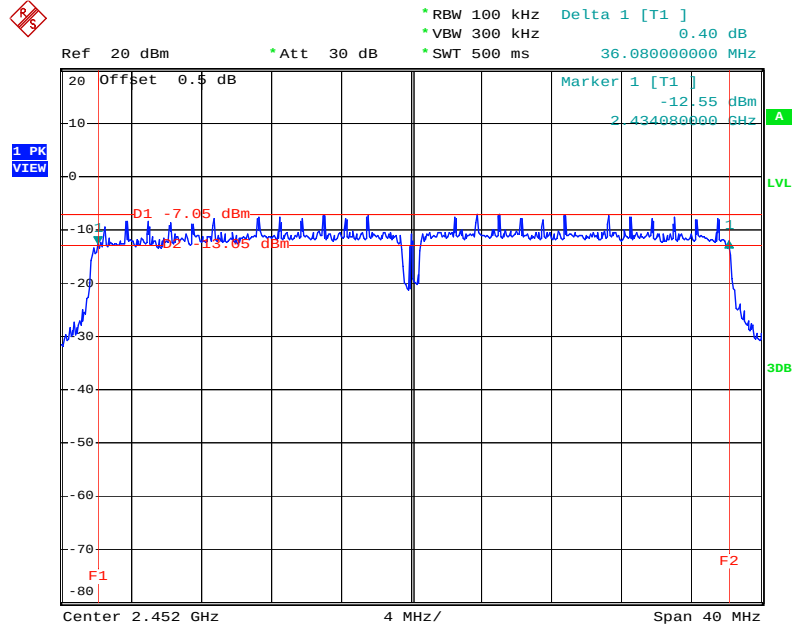
Date: 1.DEC.2011 16:05:12

6 dB Bandwidth Plot on Configuration IEEE 802.11n Port 1 (40MHz) / 2437 MHz



Date: 9.DEC.2011 21:06:09

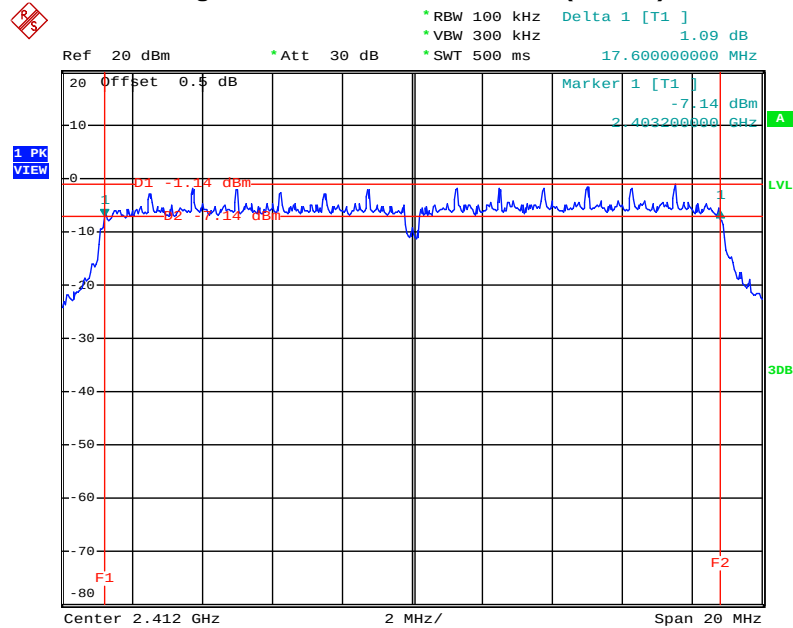
6 dB Bandwidth Plot on Configuration IEEE 802.11n Port 1 (40MHz) / 2452 MHz



Date: 9.DEC.2011 19:25:46

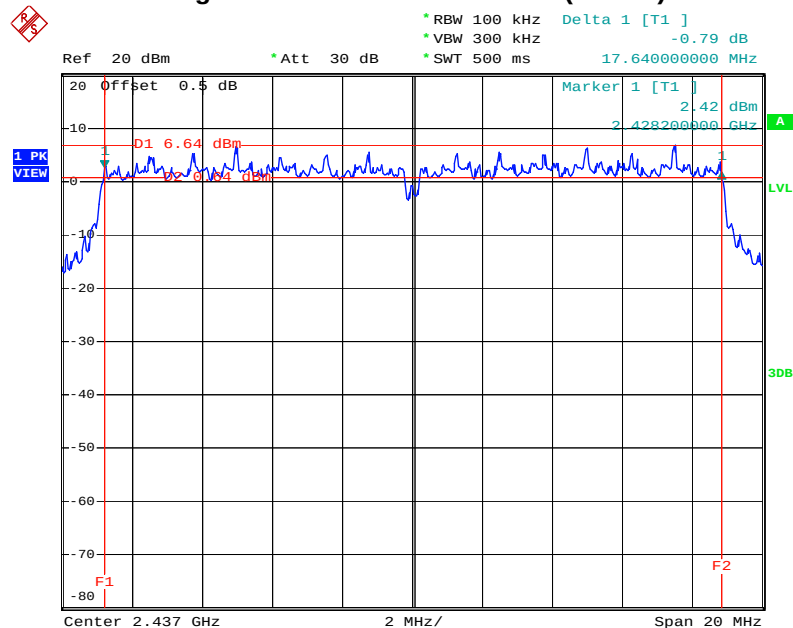
For Two Chains:

6 dB Bandwidth Plot on Configuration IEEE 802.11n Port 1 (20MHz) Port 1 / 2412 MHz



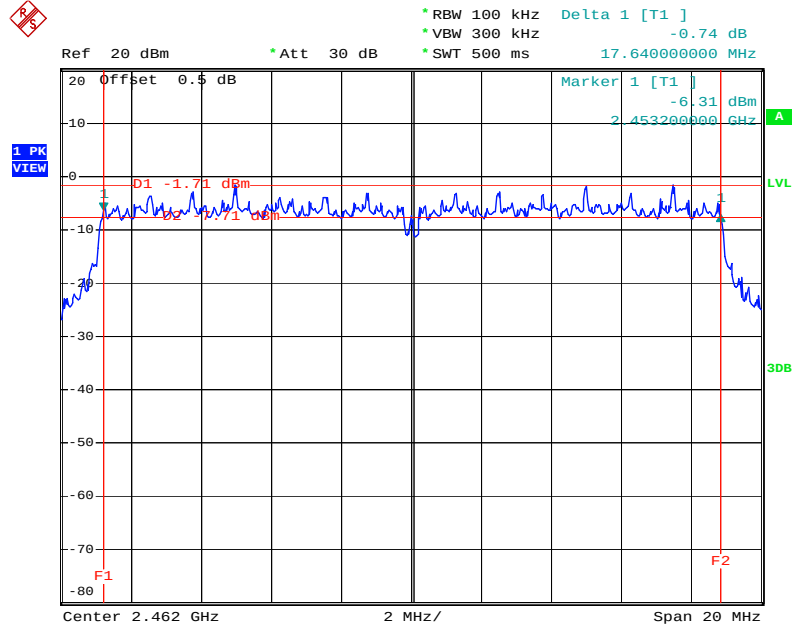
Date: 1.DEC.2011 17:14:05

6 dB Bandwidth Plot on Configuration IEEE 802.11n Port 1 (20MHz) Port 1 / 2437 MHz



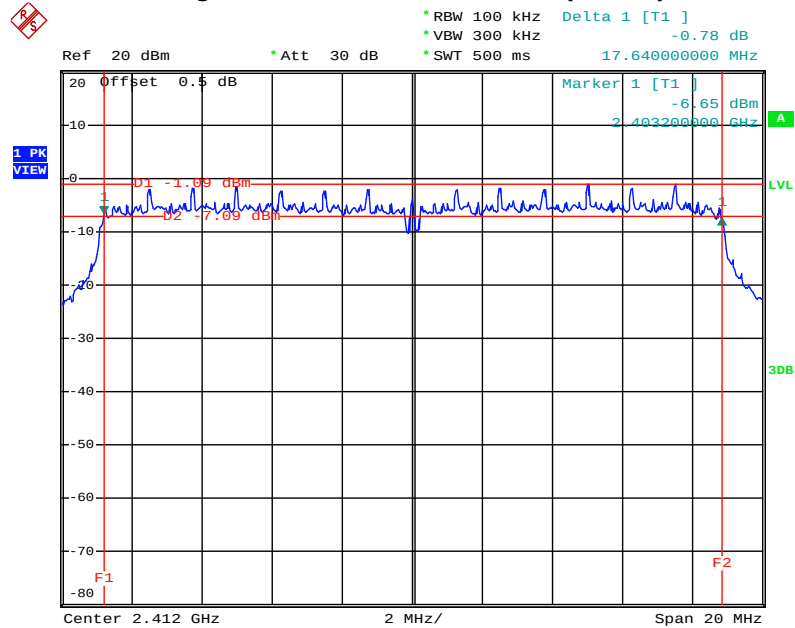
Date: 9.DEC.2011 20:23:26

6 dB Bandwidth Plot on Configuration IEEE 802.11n Port 1 (20MHz) Port 1 / 2462 MHz



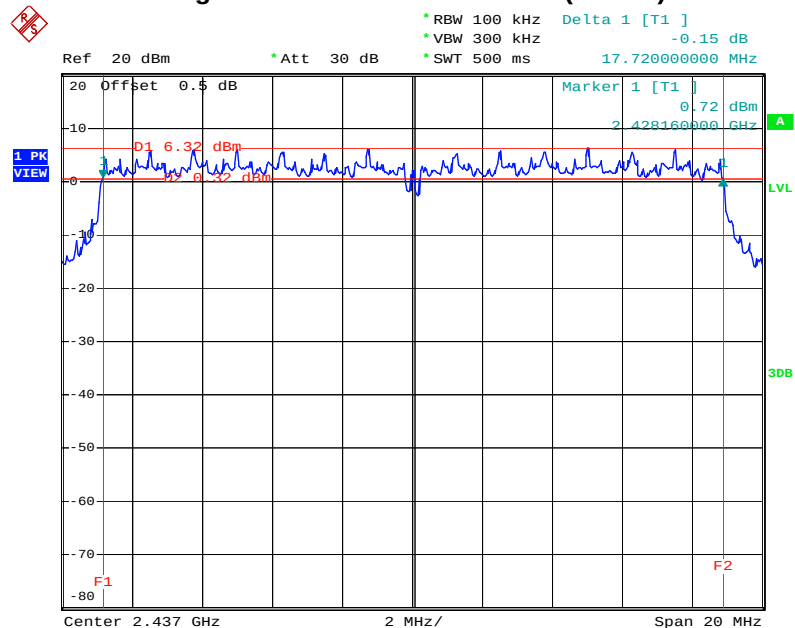
Date: 9.DEC.2011 20:16:14

6 dB Bandwidth Plot on Configuration IEEE 802.11n Port 1 (20MHz) Port 2 / 2412 MHz



Date: 1.DEC.2011 17:17:04

6 dB Bandwidth Plot on Configuration IEEE 802.11n Port 1 (20MHz) Port 2 / 2437 MHz



Date: 9.DEC.2011 20:25:25

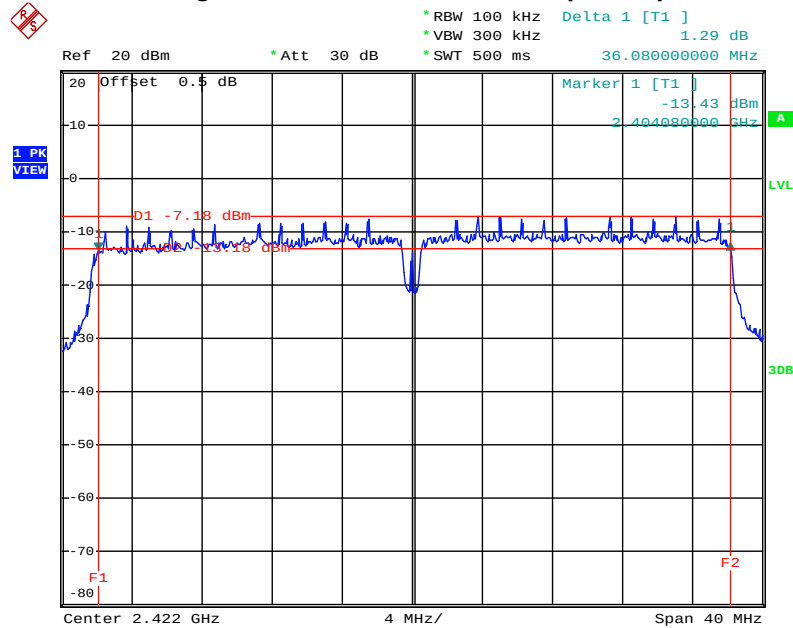


A

LVL

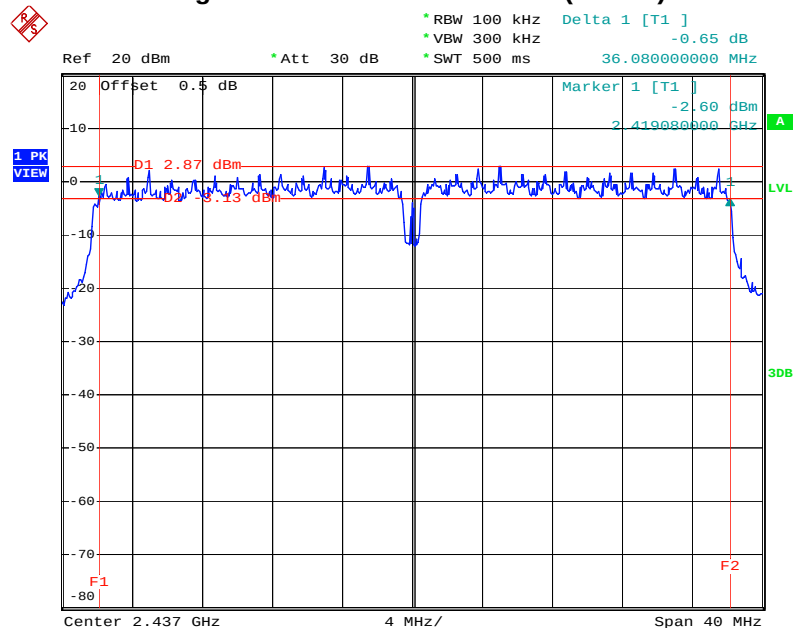
3DB

6 dB Bandwidth Plot on Configuration IEEE 802.11n Port 1 (40MHz) Port 1 / 2422 MHz



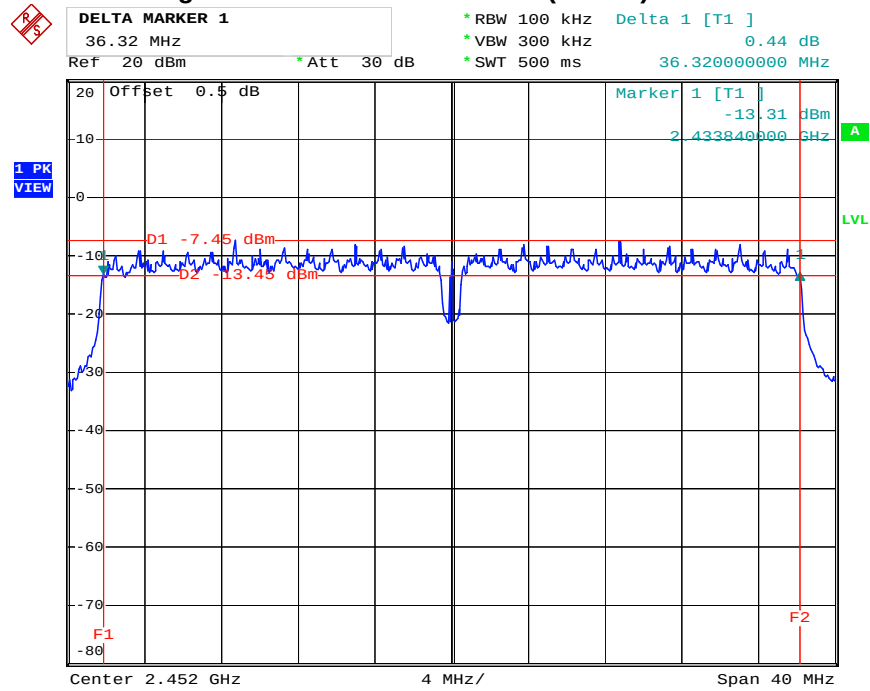
Date: 1.DEC.2011 20:07:42

6 dB Bandwidth Plot on Configuration IEEE 802.11n Port 1 (40MHz) Port 1 / 2437 MHz



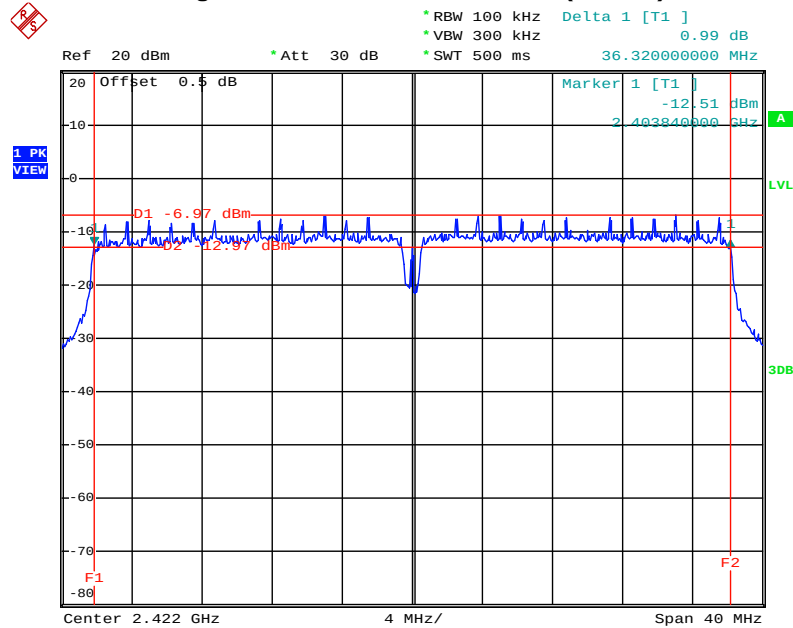
Date: 9.DEC.2011 20:48:27

6 dB Bandwidth Plot on Configuration IEEE 802.11n Port 1 (40MHz) Port 1 / 2452 MHz



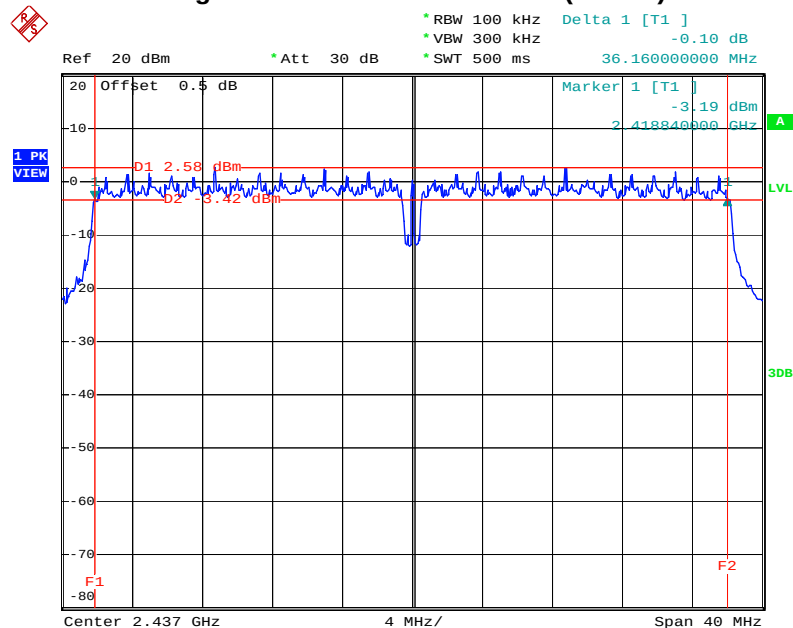
Date: 9.DEC.2011 20:40:52

6 dB Bandwidth Plot on Configuration IEEE 802.11n Port 1 (40MHz) Port 2 / 2422 MHz



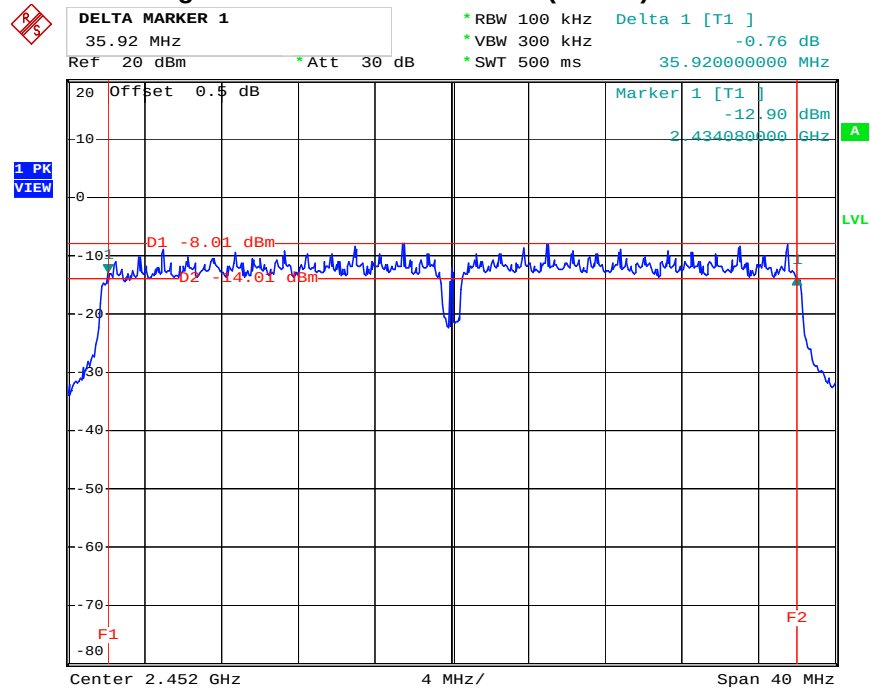
Date: 1.DEC.2011 19:44:28

6 dB Bandwidth Plot on Configuration IEEE 802.11n Port 1 (40MHz) Port 2 / 2437 MHz



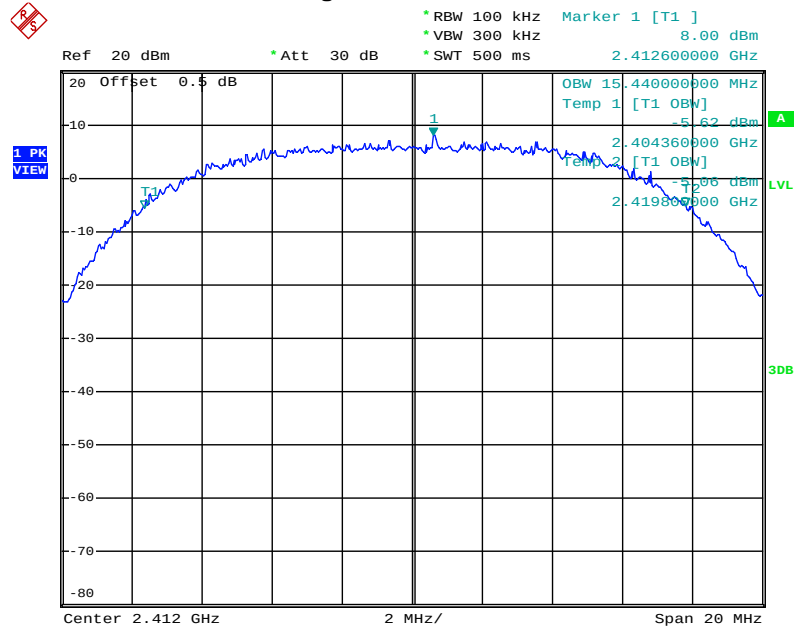
Date: 9.DEC.2011 20:50:34

6 dB Bandwidth Plot on Configuration IEEE 802.11n Port 1 (40MHz) Port 2 / 2452 MHz



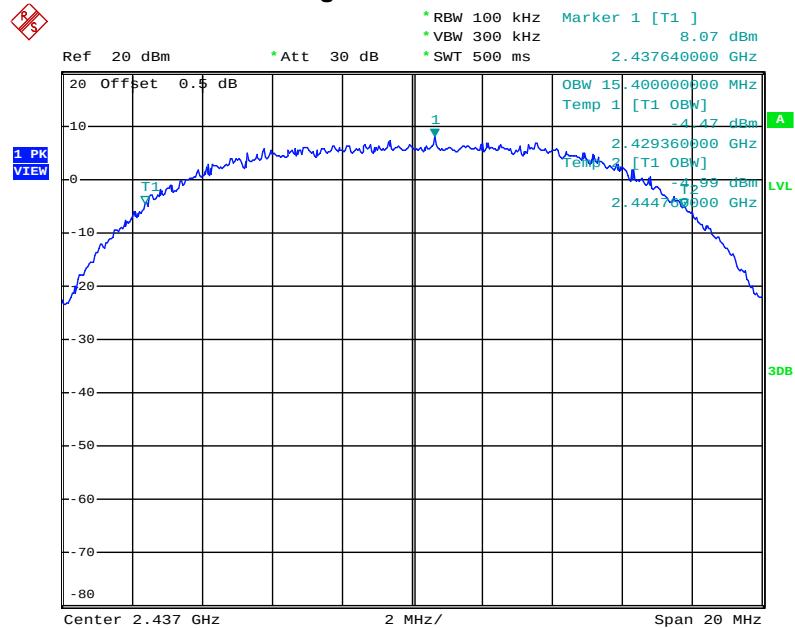
Date: 9.DEC.2011 20:43:47

For Single Chain:
99% Occupied Bandwidth Plot on Configuration IEEE 802.11b Port 1 / 2412 MHz

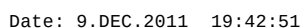


Date: 1.DEC.2011 14:19:30

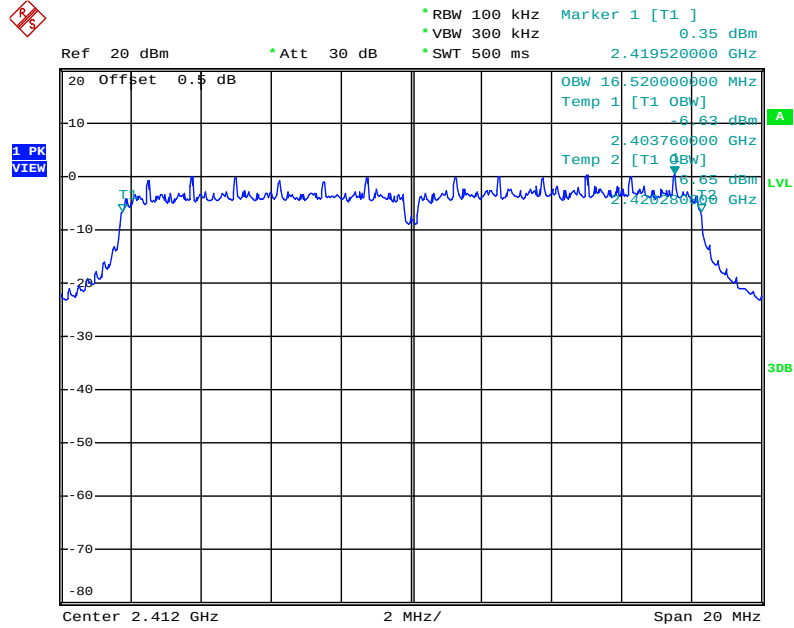
99% Occupied Bandwidth Plot on Configuration IEEE 802.11b Port 1 / 2437 MHz



Date: 1.DEC.2011 14:23:36

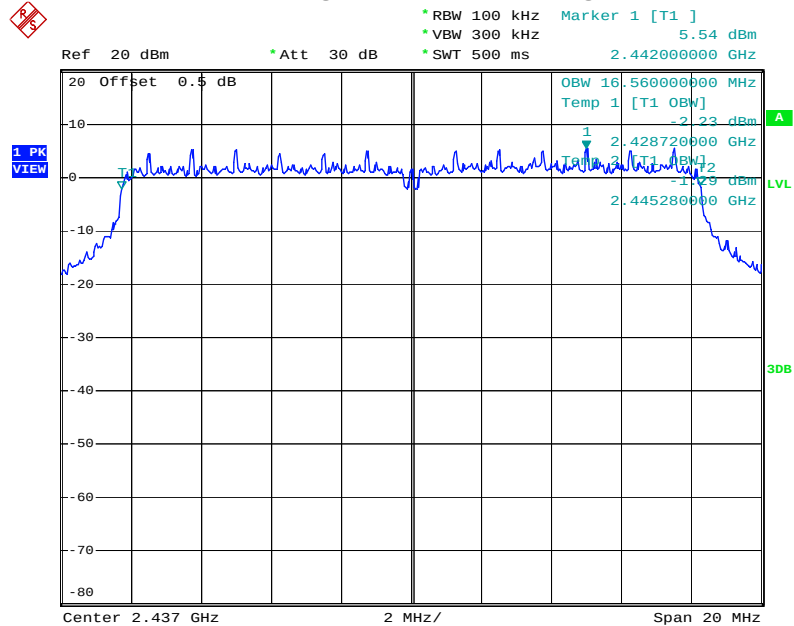


99% Occupied Bandwidth Plot on Configuration IEEE 802.11g Port 1 / 2412 MHz

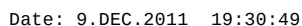


Date: 1.DEC.2011 14:47:50

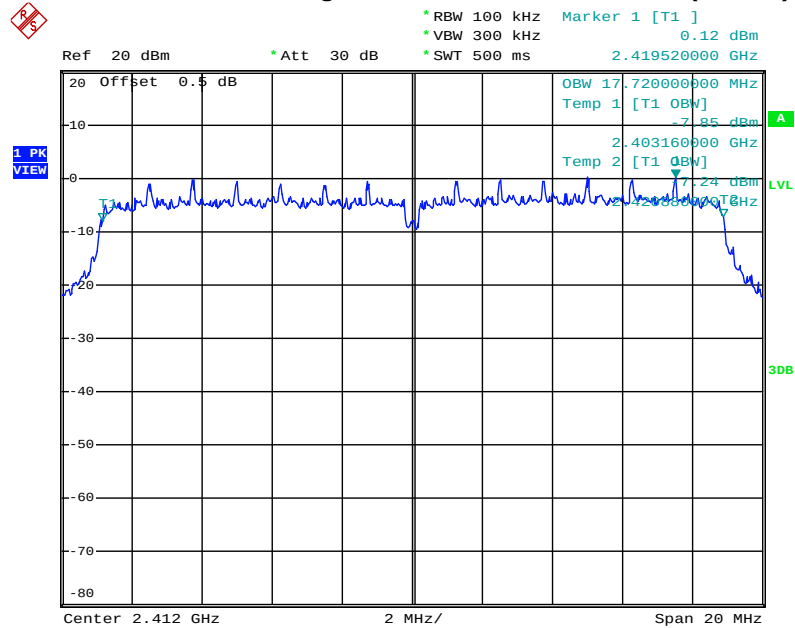
99% Occupied Bandwidth Plot on Configuration IEEE 802.11g Port 1 / 2437 MHz



Date: 9.DEC.2011 19:35:57

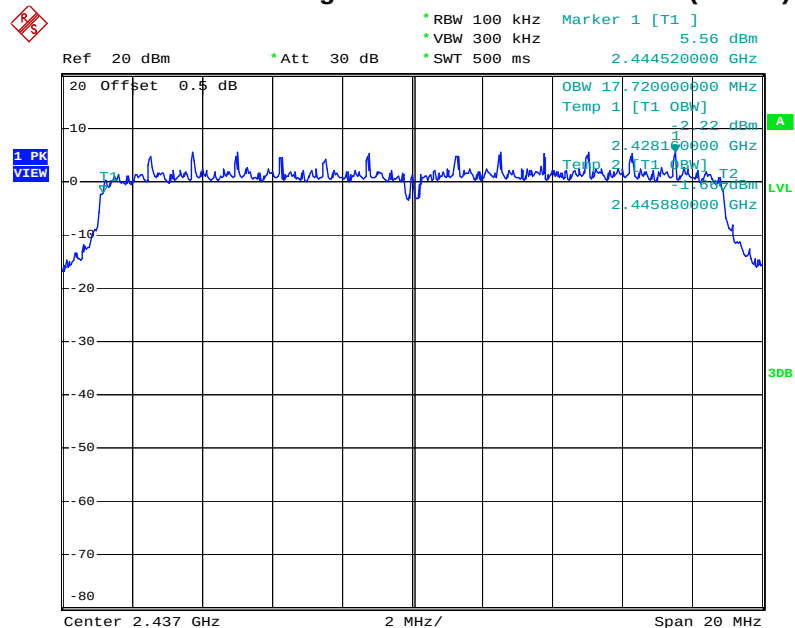


99% Occupied Bandwidth Plot on Configuration IEEE 802.11n Port 1 (20MHz) / 2412 MHz



Date: 1.DEC.2011 15:37:50

99% Occupied Bandwidth Plot on Configuration IEEE 802.11n Port 1 (20MHz) / 2437 MHz



Date: 9.DEC.2011 19:48:17

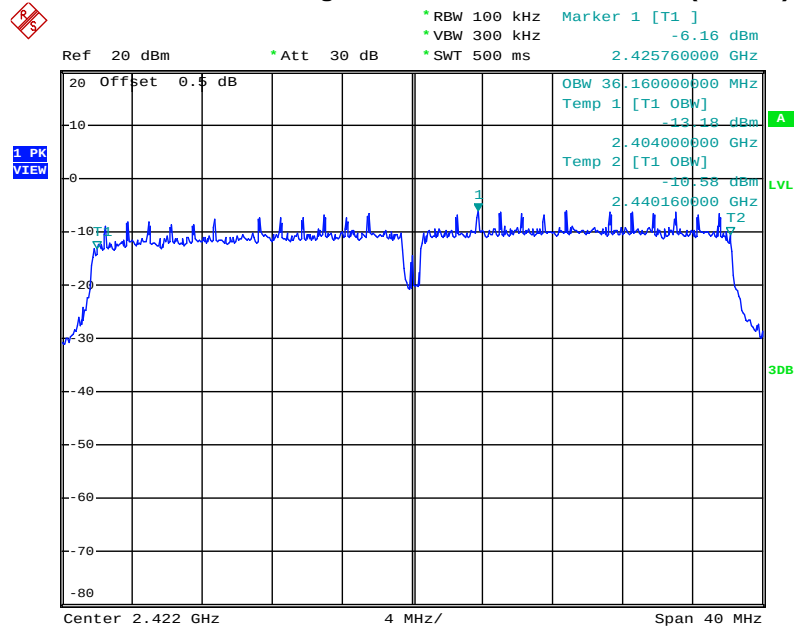


A

LVL

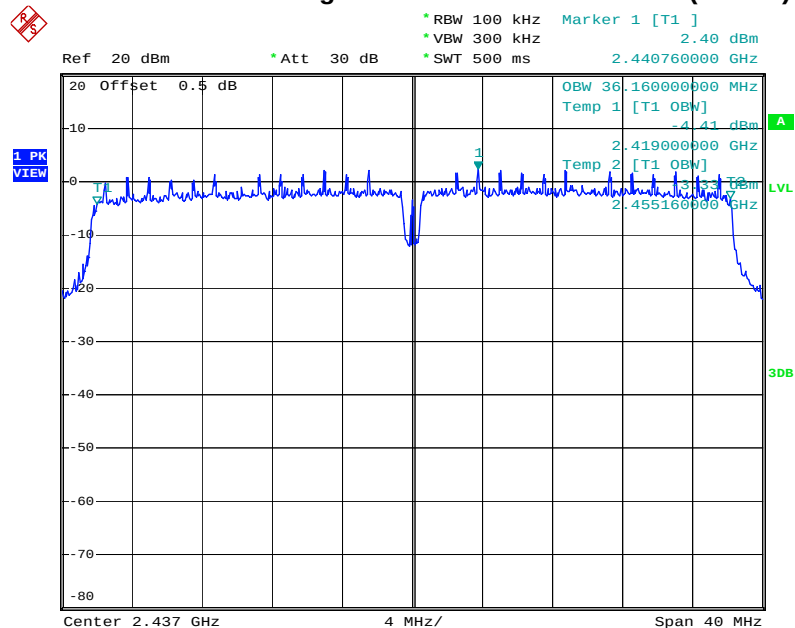
3DB

99% Occupied Bandwidth Plot on Configuration IEEE 802.11n Port 1 (40MHz) / 2422 MHz



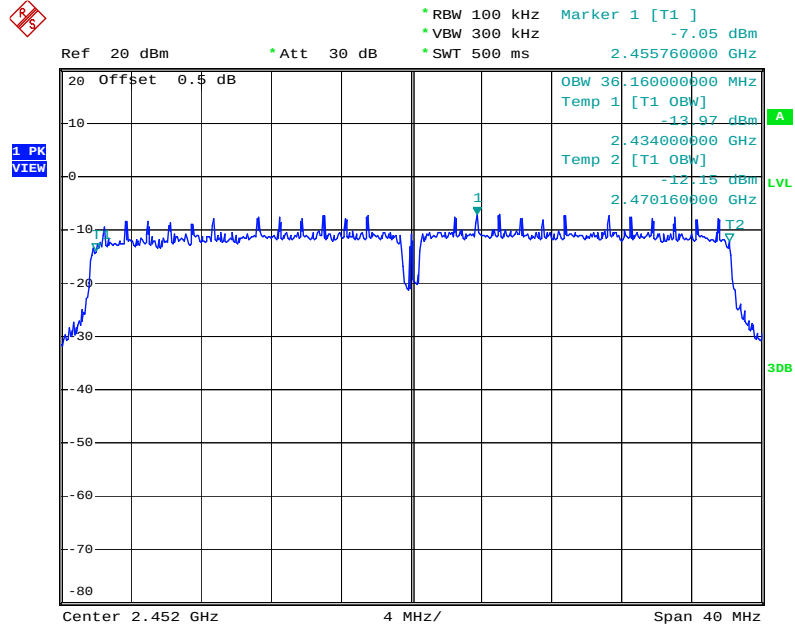
Date: 1.DEC.2011 16:05:20

99% Occupied Bandwidth Plot on Configuration IEEE 802.11n Port 1 (40MHz) / 2437 MHz



Date: 9.DEC.2011 21:06:20

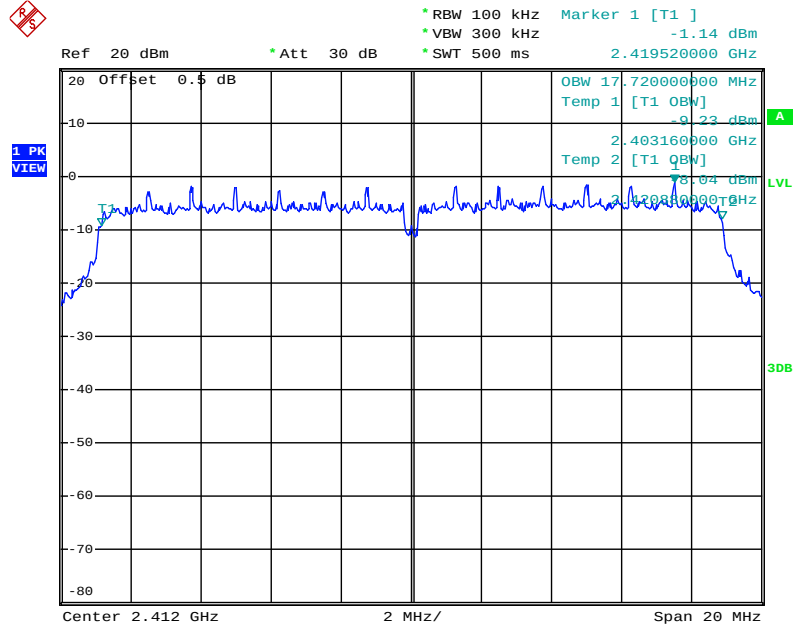
99% Occupied Bandwidth Plot on Configuration IEEE 802.11n Port 1 (40MHz) / 2452 MHz



Date: 9.DEC.2011 19:25:58

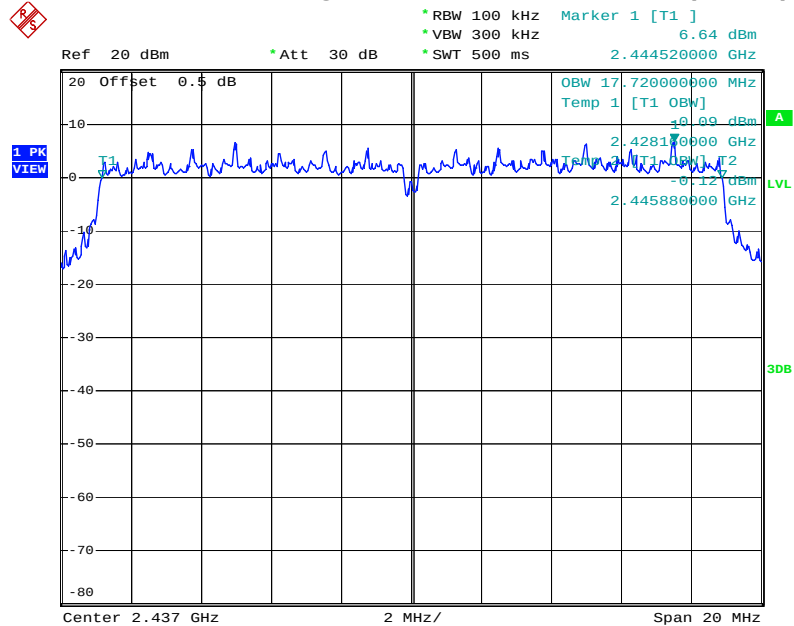
For Two Chains:

99% Occupied Bandwidth Plot on Configuration IEEE 802.11n Port 1 (20MHz) Port 1 / 2412 MHz



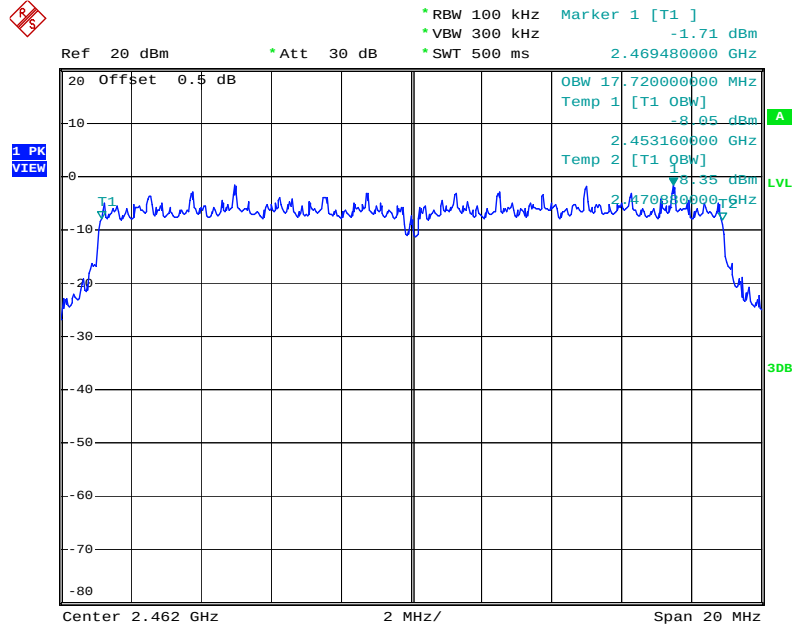
Date: 1.DEC.2011 17:14:13

99% Occupied Bandwidth Plot on Configuration IEEE 802.11n Port 1 (20MHz) Port 1 / 2437 MHz



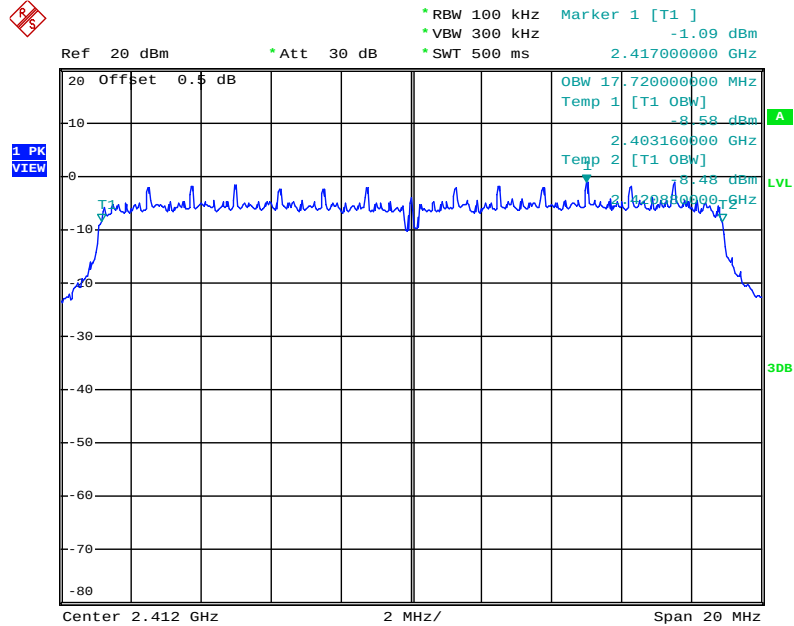
Date: 9.DEC.2011 20:23:38

99% Occupied Bandwidth Plot on Configuration IEEE 802.11n Port 1 (20MHz) Port 1 / 2462 MHz



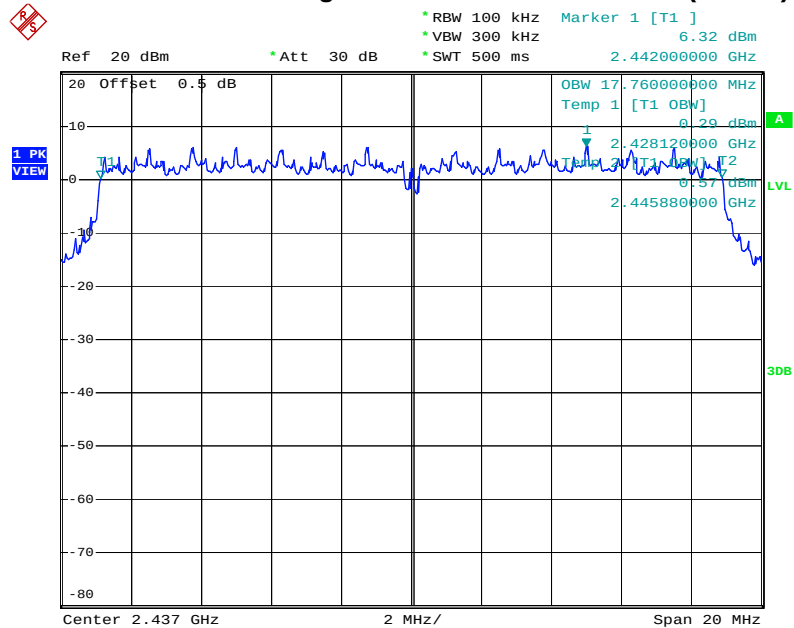
Date: 9.DEC.2011 20:16:23

99% Occupied Bandwidth Plot on Configuration IEEE 802.11n Port 1 (20MHz) Port 2 / 2412 MHz



Date: 1.DEC.2011 17:17:12

99% Occupied Bandwidth Plot on Configuration IEEE 802.11n Port 1 (20MHz) Port 2 / 2437 MHz



Date: 9.DEC.2011 20:25:33

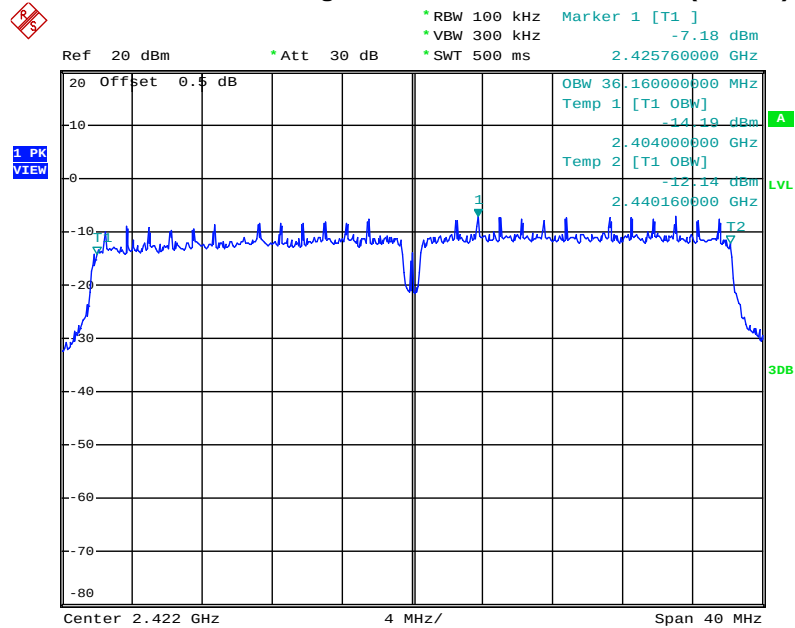


A

LVL

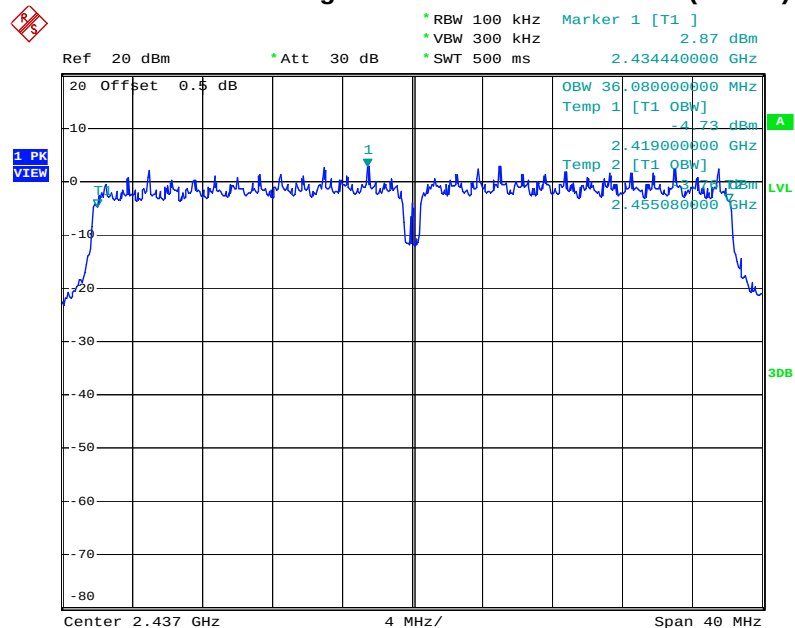
3DB

99% Occupied Bandwidth Plot on Configuration IEEE 802.11n Port 1 (40MHz) Port 1 / 2422 MHz



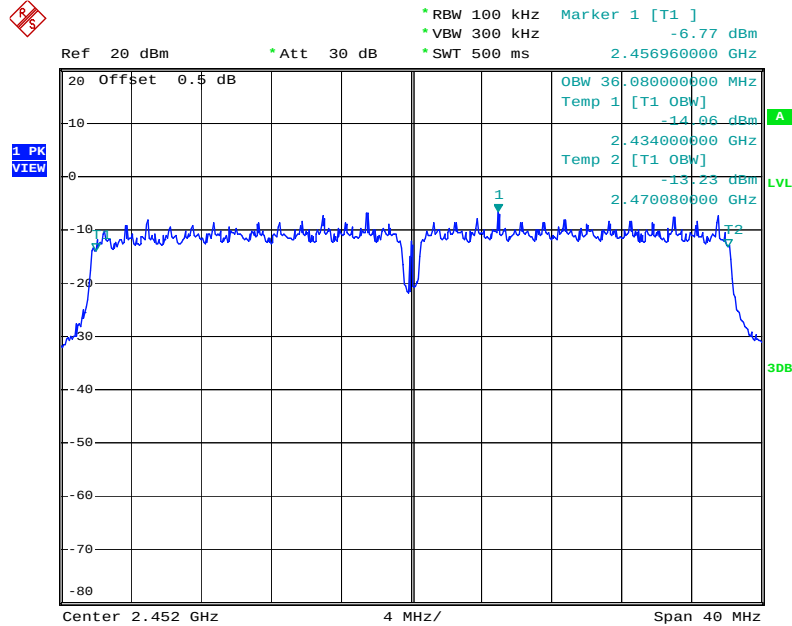
Date: 1.DEC.2011 20:07:50

99% Occupied Bandwidth Plot on Configuration IEEE 802.11n Port 1 (40MHz) Port 1 / 2437 MHz



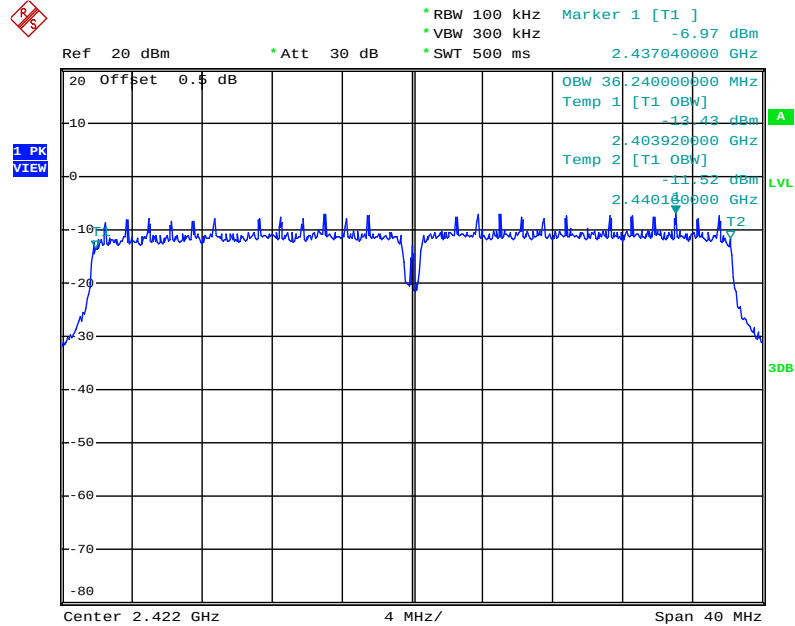
Date: 9.DEC.2011 20:48:37

99% Occupied Bandwidth Plot on Configuration IEEE 802.11n Port 1 (40MHz) Port 1 / 2452 MHz



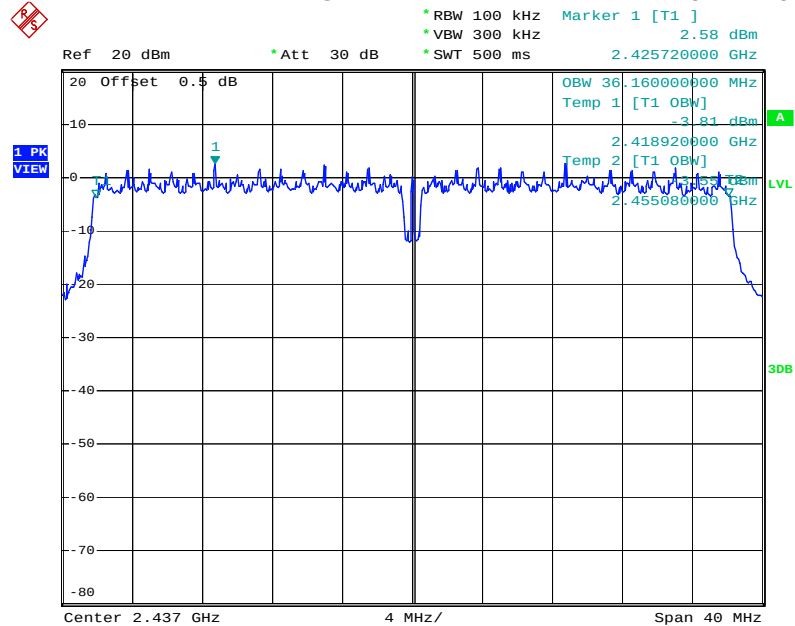
Date: 9.DEC.2011 20:41:01

99% Occupied Bandwidth Plot on Configuration IEEE 802.11n Port 1 (40MHz) Port 2 / 2422 MHz



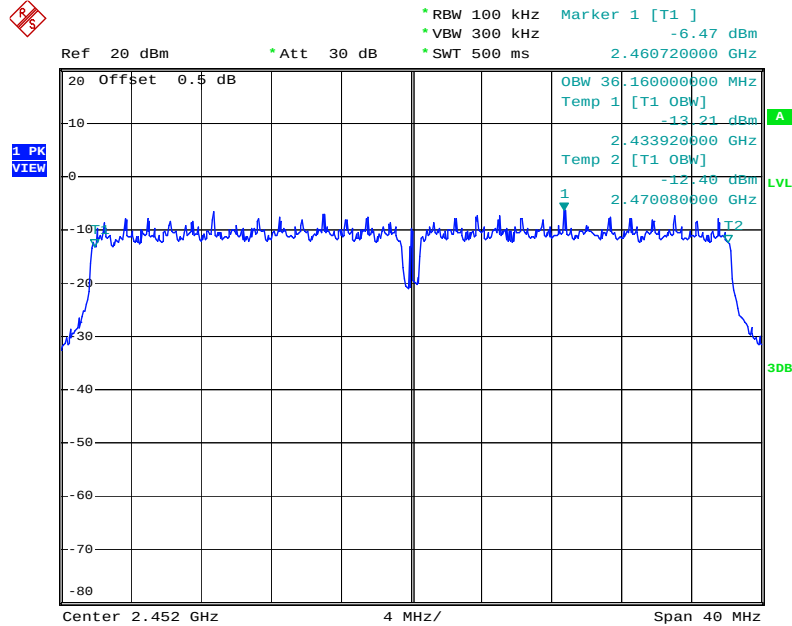
Date: 1.DEC.2011 19:44:41

99% Occupied Bandwidth Plot on Configuration IEEE 802.11n Port 1 (40MHz) Port 2 / 2437 MHz



Date: 9.DEC.2011 20:50:43

99% Occupied Bandwidth Plot on Configuration IEEE 802.11n Port 1 (40MHz) Port 2 / 2452 MHz



Date: 9.DEC.2011 20:43:59

3.5 Radiated Emissions Measurement

3.5.1 Limit

In any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. If the transmitter measurement is based on the maximum conducted output power, the attenuation required under this paragraph shall be 30dB instead of 20dB. In addition, radiated emissions which fall in section 15.205(a) the restricted bands must also comply with the radiated emission limit specified in section 15.209(a).

Frequencies (MHz)	Field Strength (microvolt/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

3.5.2 Measuring Instruments and Setting

Please refer to section 4 of equipments list in this report. The following table is the setting of spectrum analyzer and receiver.

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB (Emission in restricted band)	1MHz / 1MHz for Peak, 1 MHz / 10Hz for Average
RB / VB (Emission in non-restricted band)	1MHz / 1MHz for peak

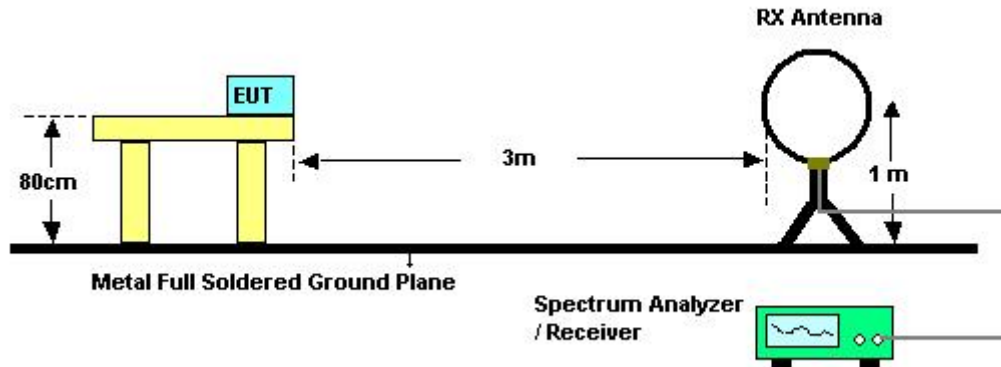
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

3.5.3 Test Procedures

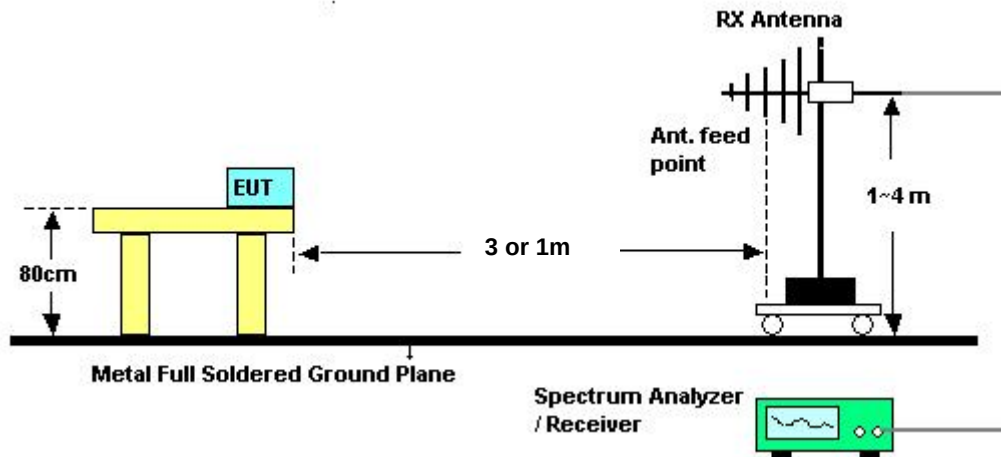
1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz VBW and RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer.
7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.
8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High – Low scan is not required in this case.

3.5.4 Test Setup Layout

For radiated emissions below 30MHz



For radiated emissions above 30MHz



Above 10 GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade from 3m to 1m.

Distance extrapolation factor = $20 \log (\text{specific distance [3m]} / \text{test distance [1m]})$ (dB);

Limit line = specific limits (dBUV) + distance extrapolation factor [9.54 dB].

3.5.5 Test Deviation

There is no deviation with the original standard.

3.5.6 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

3.5.7 Results of Radiated Emissions (9kHz~30MHz)

Final Test Date	Dec. 02, 2011	Test Site No.	03CH02-HY
Temperature	22.3℃	Humidity	62%
Test Engineer	Daniel		

Freq. (MHz)	Level (dBuV)	Over Limit (dB)	Limit Line (dBuV)	Remark
-	-	-	-	See Note

Note:

The amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.

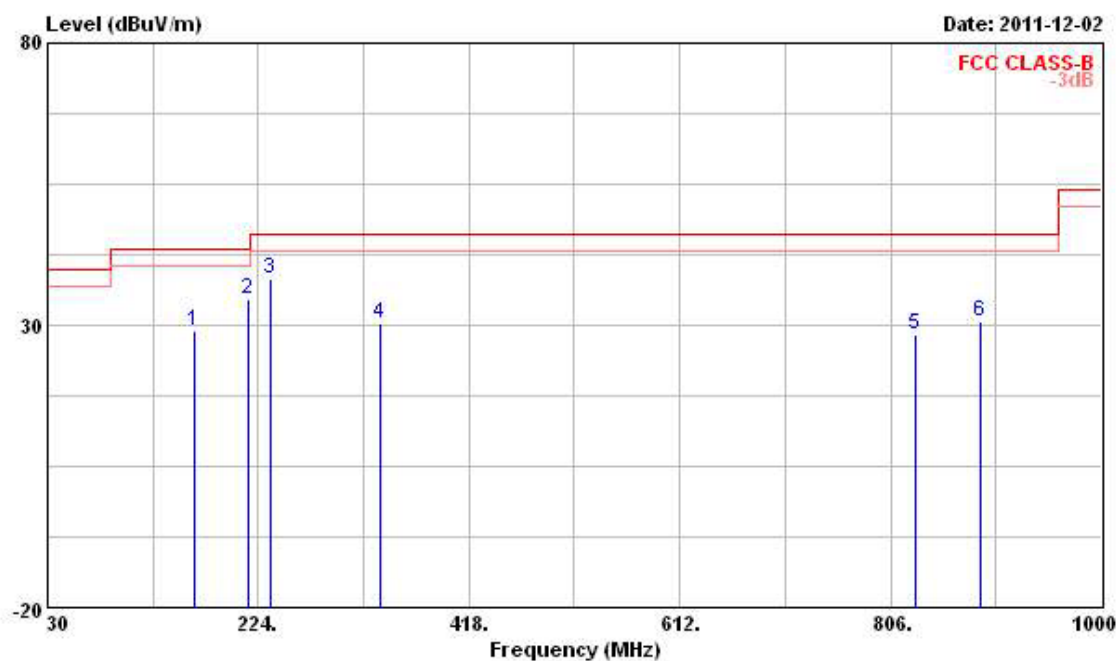
Distance extrapolation factor = $40 \log (\text{specific distance} / \text{test distance})$ (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor.

3.5.8 Results of Radiated Emissions (30MHz~1GHz)

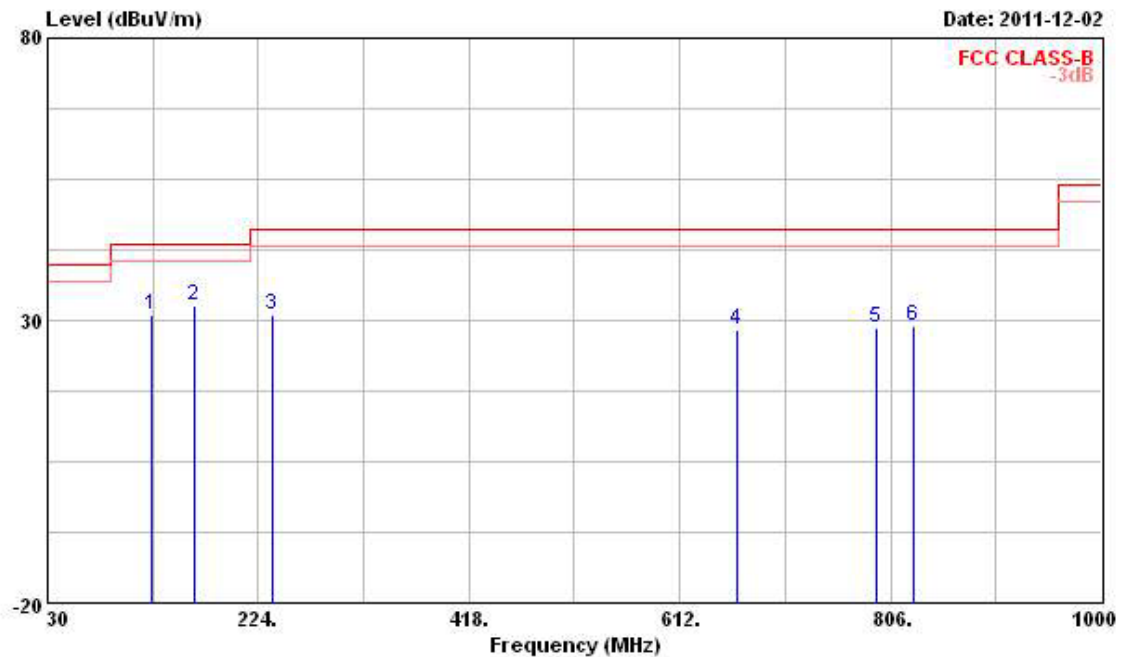
Final Test Date	Dec. 02, 2011	Test Site No.	03CH02-HY
Temperature	22.3℃	Humidity	62%
Test Engineer	Daniel	Configuration	Normal Mode

Horizontal



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	164.830	28.89	-14.61	43.50	43.97	10.34	2.14	27.56	Peak	---	---
2	214.300	34.71	-8.79	43.50	47.72	11.83	2.53	27.37	Peak	---	---
3	234.670	38.32	-7.68	46.00	50.48	12.49	2.67	27.32	Peak	---	---
4	335.550	30.30	-15.70	46.00	40.33	14.26	3.12	27.41	Peak	---	---
5	828.310	28.25	-17.75	46.00	30.91	20.20	4.98	27.84	Peak	---	---
6	889.420	30.64	-15.36	46.00	33.01	20.05	5.21	27.63	Peak	---	---

Vertical



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	126.030	31.03	-12.47	43.50	43.80	13.10	1.87	27.74	Peak	---	---
2	164.830	32.70	-10.80	43.50	47.78	10.34	2.14	27.56	Peak	---	---
3	237.580	30.97	-15.03	46.00	43.01	12.59	2.69	27.32	Peak	---	---
4	664.380	28.21	-17.79	46.00	32.80	19.32	4.43	28.34	Peak	---	---
5	792.420	28.69	-17.31	46.00	31.63	20.16	4.86	27.96	Peak	---	---
6	827.340	29.11	-16.89	46.00	31.77	20.20	4.98	27.84	Peak	---	---

Note:

The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

Emission level (dBuV/m) = 20 log Emission level (uV/m).

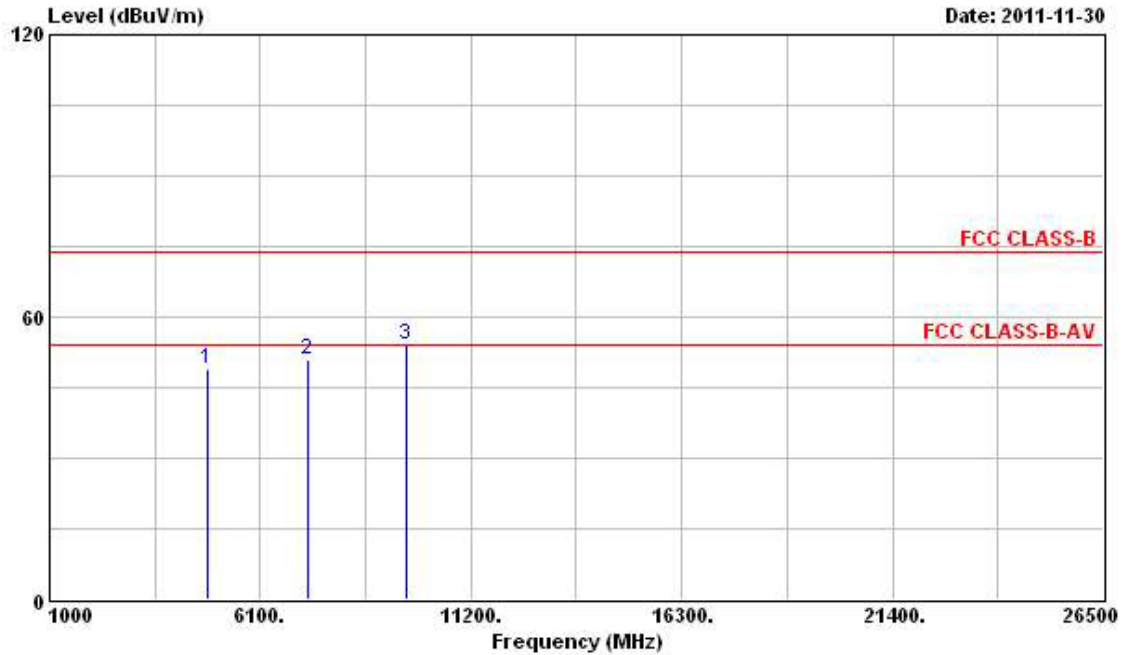
Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

3.5.9 Results for Radiated Emissions (1GHz~10th Harmonic)

For Single Chain:

Final Test Date	Nov. 30, 2011	Test Site No.	03CH02-HY
Temperature	22.3°C	Humidity	62%
Test Engineer	Daniel	Configuration	802.11b Ch. 1

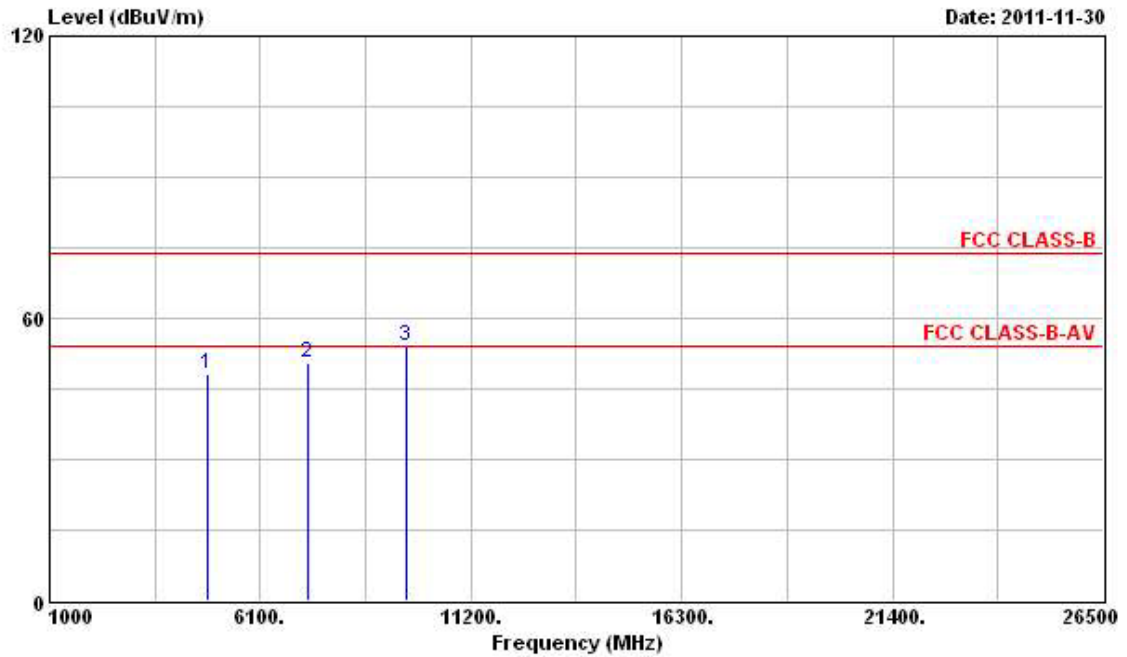
Horizontal



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4824.000	48.88	-5.12	54.00	43.34	35.76	4.58	34.80	PK	---	---
2	7236.000	50.93			42.53	37.85	5.63	35.08	Peak	---	---
3	9648.000	54.27			44.01	39.39	6.34	35.47	Peak	---	---

Note: The items 2 and 3 are on un-restricted band, so the limit is -20dB for the field strength of the fundamental emissions (see section 3.6.7).

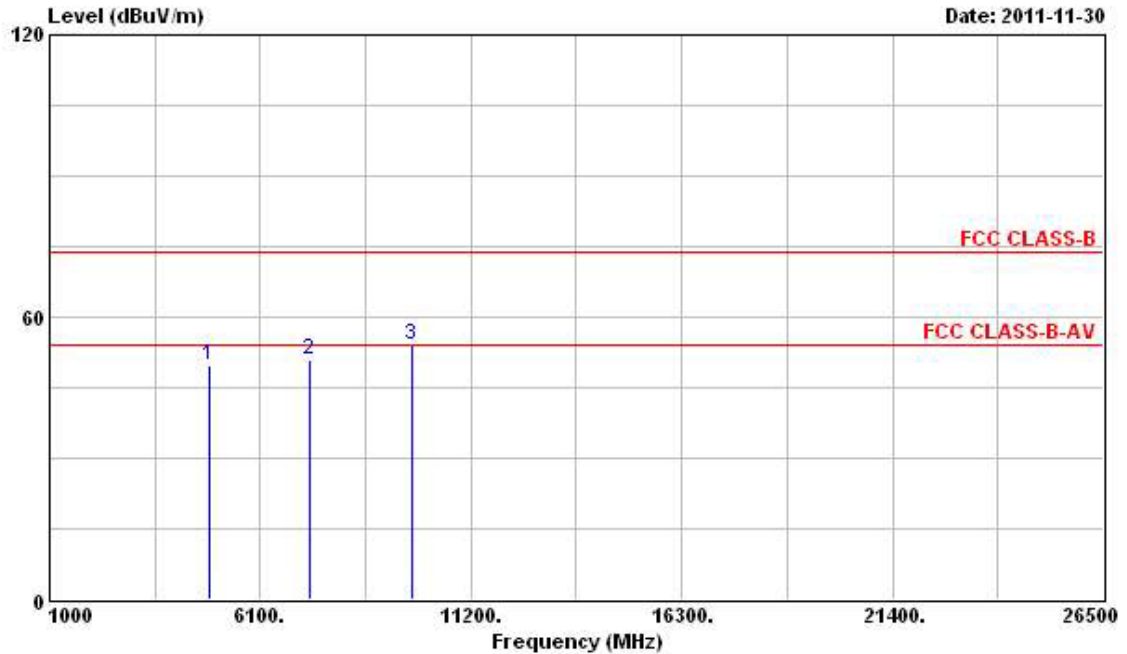
Vertical



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4824.000	48.21	-5.79	54.00	43.30	35.13	4.58	34.80	PK	---	---
2	7236.000	50.57			43.12	36.90	5.63	35.08	Peak	---	---
3	9648.000	54.15			44.69	38.59	6.34	35.47	Peak	---	---

Note: The items 2 and 3 are on un-restricted band, so the limit is -20dB for the field strength of the fundamental emissions (see section 3.6.7).

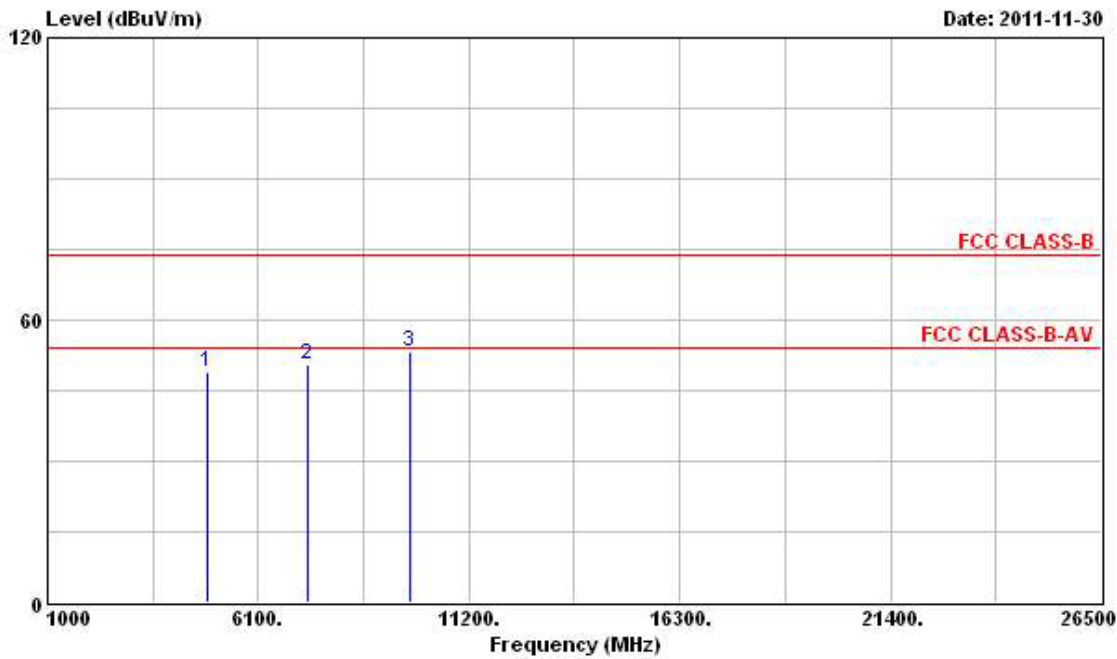
Final Test Date	Nov. 30, 2011	Test Site No.	03CH02-HY
Temperature	22.3°C	Humidity	62%
Test Engineer	Daniel	Configuration	802.11b Ch. 6

Horizontal

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4874.000	49.87	-4.13	54.00	44.21	35.83	4.61	34.78	PK	---	---
2	7311.000	50.89	-3.11	54.00	42.49	37.86	5.64	35.10	PK	---	---
3	9748.000	53.90			43.51	39.51	6.36	35.48	Peak	---	---

Note: The item 3 is on un-restricted band, so the limit is -20dB for the field strength of the fundamental emissions (see section 3.6.7).

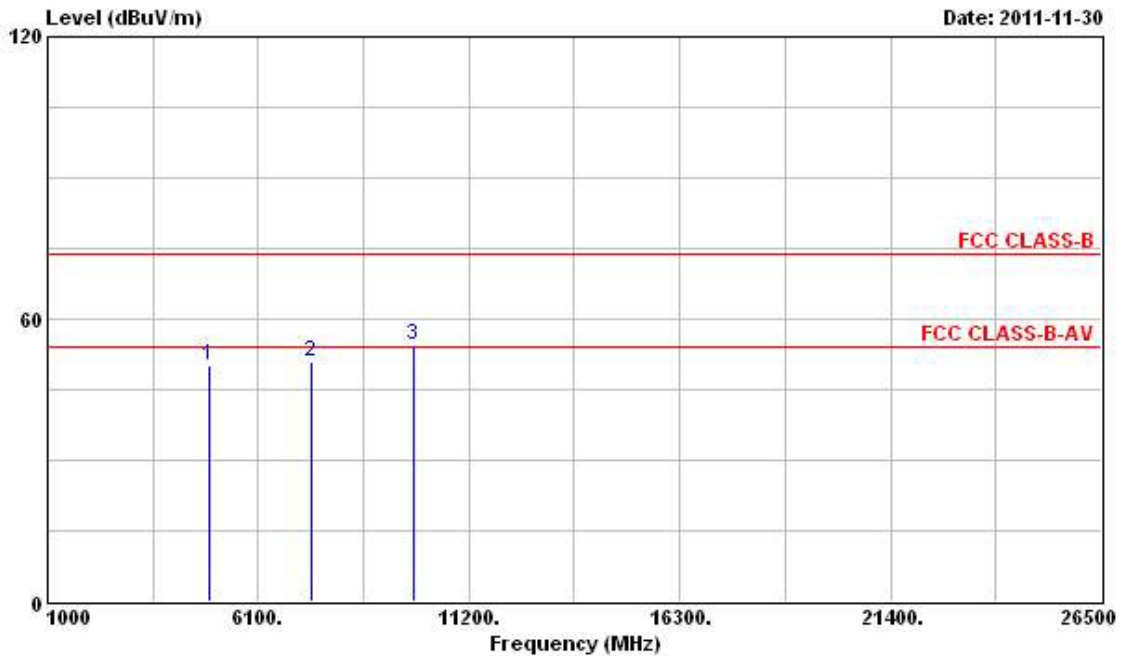
Vertical



	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp		Ant	Table
	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	Factor	Pos	Pos
			dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1	4874.000	49.03	-4.97	54.00	44.02	35.18	4.61	34.78	PK	---
2	7311.000	50.61	-3.39	54.00	43.15	36.92	5.64	35.10	PK	---
3	9748.000	53.29			43.70	38.71	6.36	35.48	Peak	---

Note: The item 3 is on un-restricted band, so the limit is -20dB for the field strength of the fundamental emissions (see section 3.6.7).

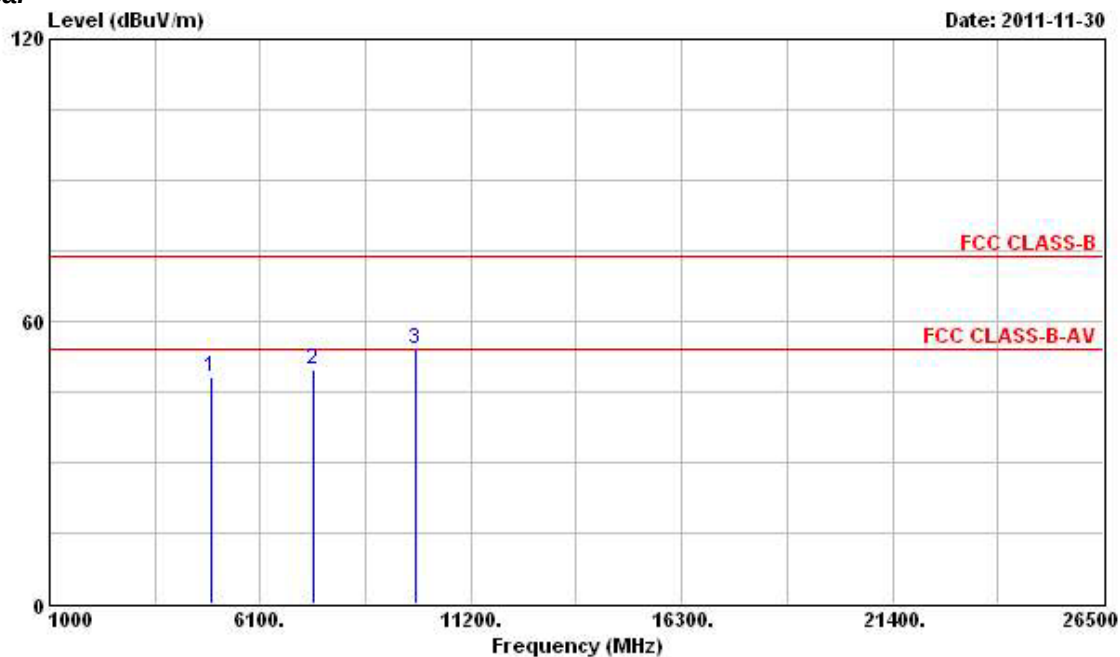
Final Test Date	Nov. 30, 2011	Test Site No.	03CH02-HY
Temperature	22.3°C	Humidity	62%
Test Engineer	Daniel	Configuration	802.11b Ch. 11

Horizontal

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4924.000	50.10	-3.90	54.00	44.29	35.90	4.68	34.77	PK	---	---
2	7386.000	50.83	-3.17	54.00	42.42	37.88	5.65	35.12	PK	---	---
3	9848.000	54.34			43.84	39.61	6.38	35.49	Peak	---	---

Note: The item 3 is on un-restricted band, so the limit is -20dB for the field strength of the fundamental emissions (see section 3.6.7).

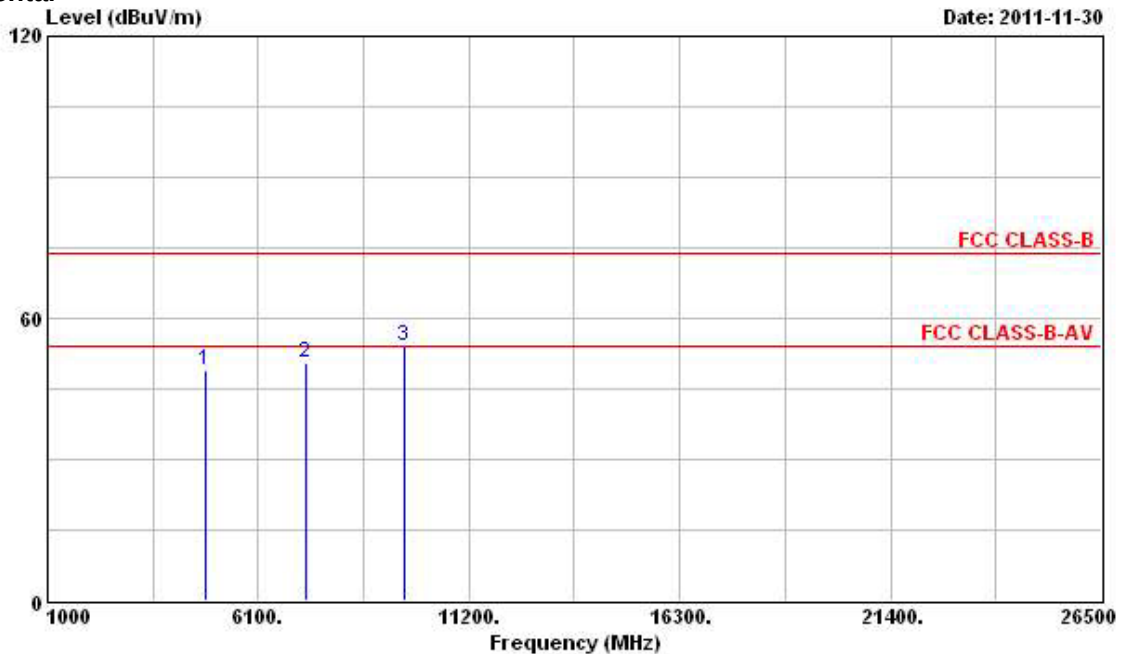
Vertical



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4924.000	48.04	-5.96	54.00	42.90	35.23	4.68	34.77	PK	---	---
2	7386.000	49.90	-4.10	54.00	42.41	36.96	5.65	35.12	PK	---	---
3	9848.000	54.14			44.44	38.81	6.38	35.49	Peak	---	---

N Note: The item 3 is on un-restricted band, so the limit is -20dB for the field strength of the fundamental emissions (see section 3.6.7).

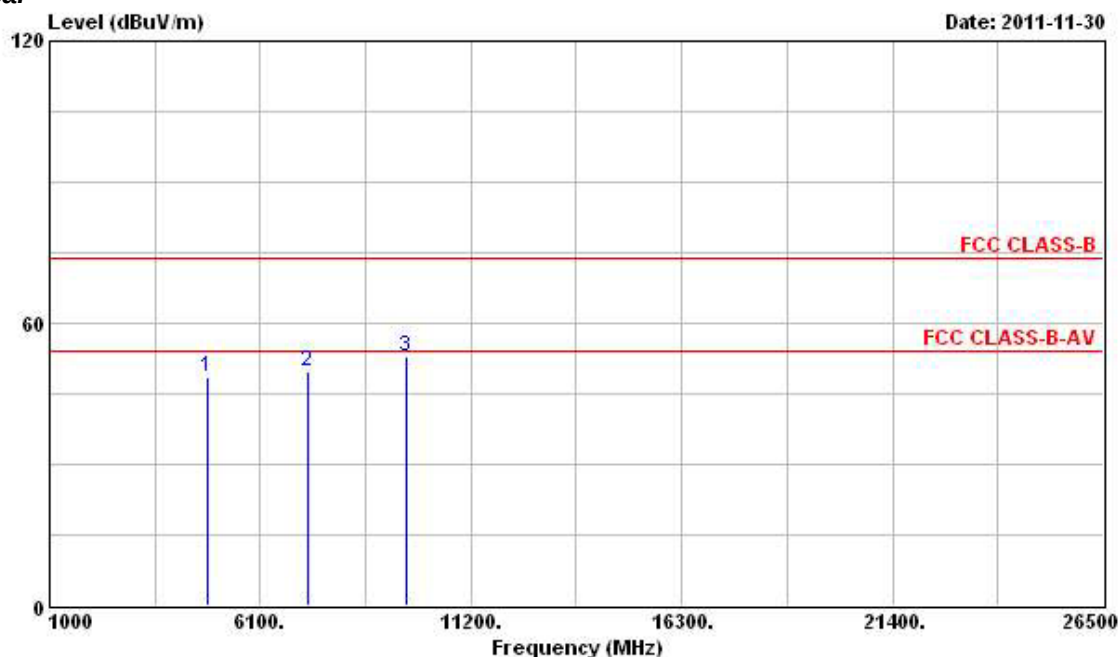
Final Test Date	Nov. 30, 2011	Test Site No.	03CH02-HY
Temperature	22.3°C	Humidity	62%
Test Engineer	Daniel	Configuration	802.11g Ch. 1

Horizontal

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4824.000	48.84	-5.16	54.00	43.30	35.76	4.58	34.80	PK	---	---
2	7236.000	50.64			42.24	37.85	5.63	35.08	Peak	---	---
3	9648.000	54.20			43.94	39.39	6.34	35.47	Peak	---	---

Note: The items 2 and 3 are on un-restricted band, so the limit is -20dB for the field strength of the fundamental emissions (see section 3.6.7).

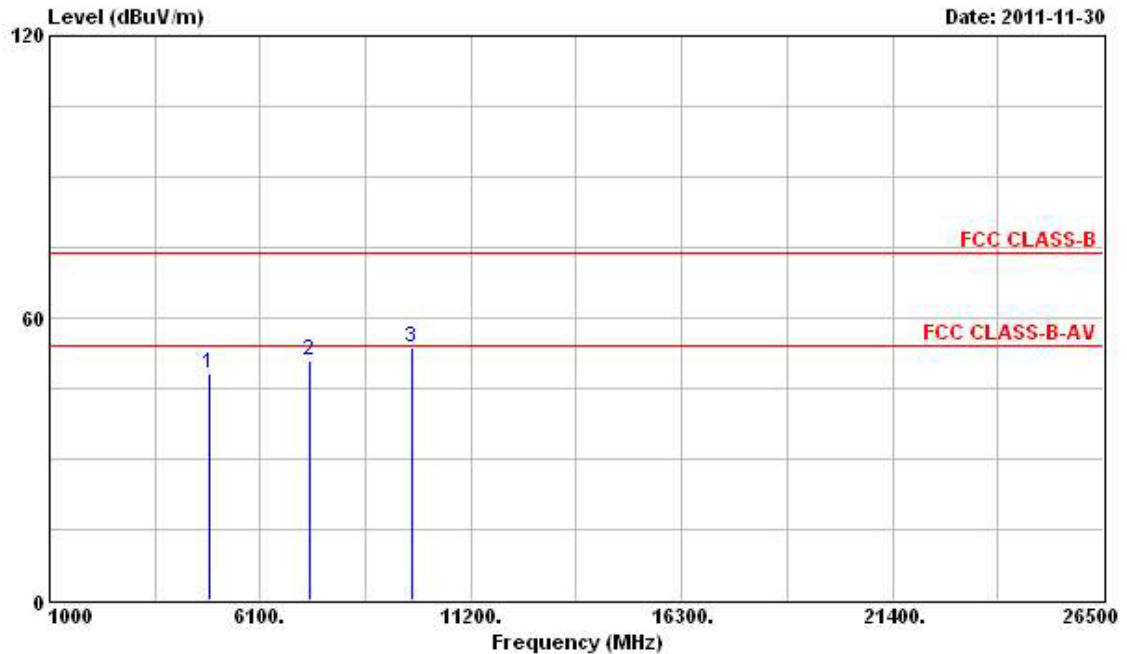
Vertical



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4824.000	48.55	-5.45	54.00	43.64	35.13	4.58	34.80	PK	---	---
2	7236.000	49.57			42.12	36.90	5.63	35.08	Peak	---	---
3	9648.000	52.79			43.33	38.59	6.34	35.47	Peak	---	---

Note: The items 2 and 3 are on un-restricted band, so the limit is -20dB for the field strength of the fundamental emissions (see section 3.6.7).

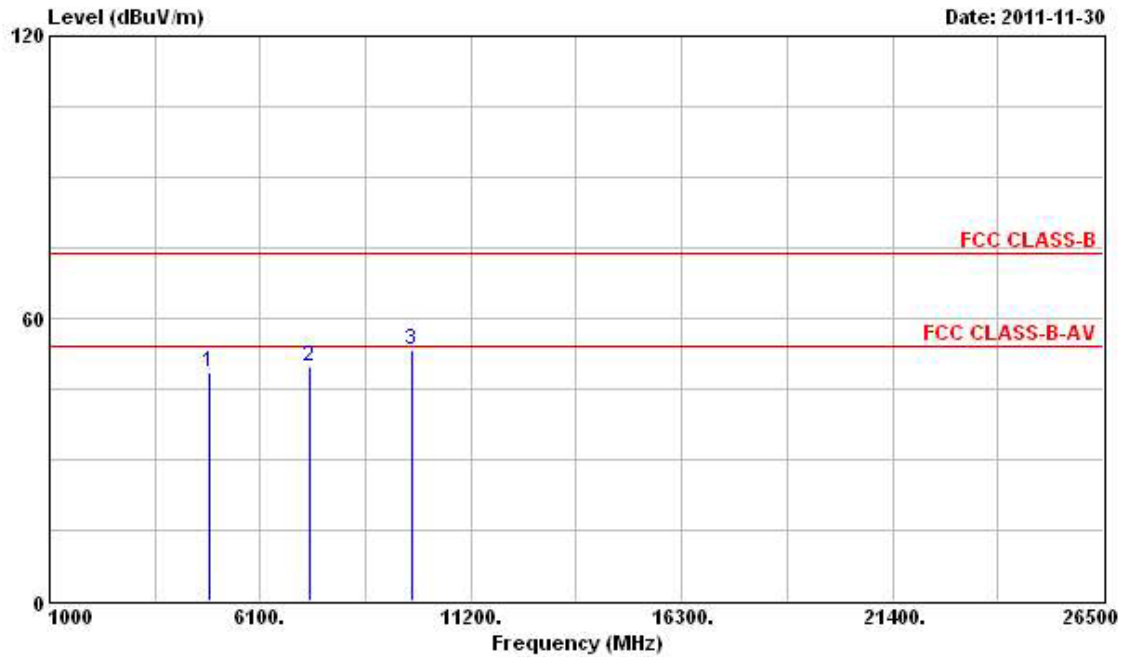
Final Test Date	Nov. 30, 2011	Test Site No.	03CH02-HY
Temperature	22.3°C	Humidity	62%
Test Engineer	Daniel	Configuration	802.11g Ch. 6

Horizontal

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4874.000	48.22	-5.78	54.00	42.56	35.83	4.61	34.78	PK	---	---
2	7311.000	50.75	-3.25	54.00	42.35	37.86	5.64	35.10	PK	---	---
3	9748.000	53.60			43.21	39.51	6.36	35.48	Peak	---	---

Note: The item 3 is on un-restricted band, so the limit is -20dB for the field strength of the fundamental emissions (see section 3.6.7).

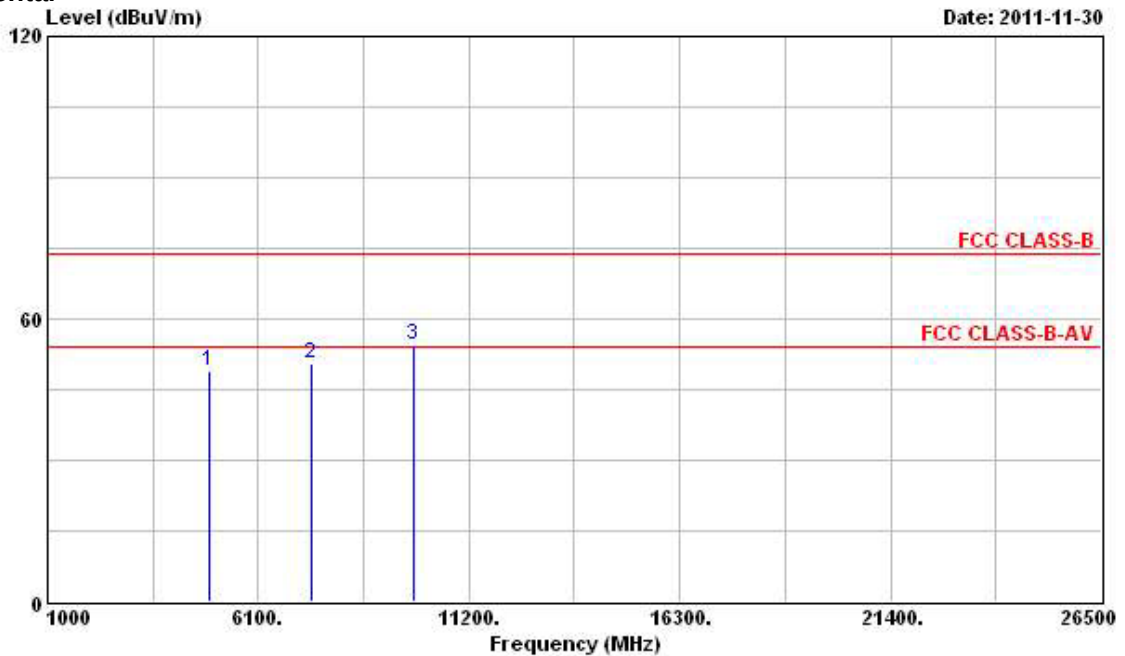
Vertical



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4874.000	48.58	-5.42	54.00	43.57	35.18	4.61	34.78	PK	---	---
2	7311.000	49.56	-4.44	54.00	42.10	36.92	5.64	35.10	PK	---	---
3	9748.000	53.26			43.67	38.71	6.36	35.48	Peak	---	---

Note: The item 3 is on un-restricted band, so the limit is -20dB for the field strength of the fundamental emissions (see section 3.6.7).

Final Test Date	Nov. 30, 2011	Test Site No.	03CH02-HY
Temperature	22.3°C	Humidity	62%
Test Engineer	Daniel	Configuration	802.11g Ch. 11

Horizontal

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4924.000	48.84	-5.16	54.00	43.03	35.90	4.68	34.77	PK	---	---
2	7386.000	50.59	-3.41	54.00	42.18	37.88	5.65	35.12	PK	---	---
3	9848.000	54.36			43.86	39.61	6.38	35.49	Peak	---	---

Note: The item 3 is on un-restricted band, so the limit is -20dB for the field strength of the fundamental emissions (see section 3.6.7).